

Cambodia and Thailand Battle Over a Khmer Temple

ARCHAEOLOGY

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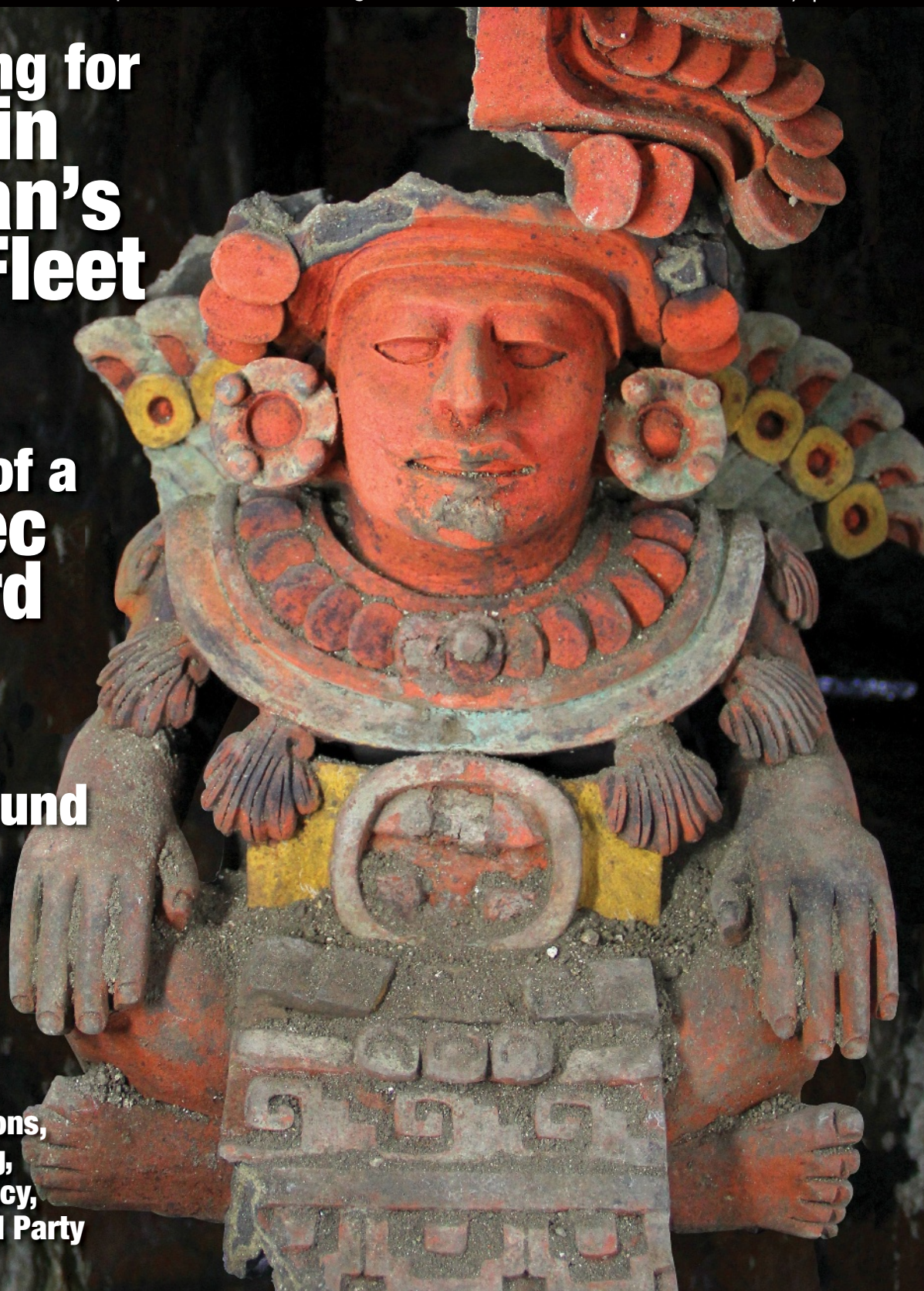
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Portrait of a Zapotec Warlord

Medieval Munich Underground

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Apartment of Paul Singer, Summit, New Jersey, 1997. Photo by John Tsantes.

CONTENTS

features

24 Munich Underground

A metropolis' modern needs help reveal its hidden history

BY ANDREW CURRY

30 Pirates of the Original Panama Canal

Searching for the remains of Captain Henry Morgan's raid on Panama City

BY SAMIR S. PATEL

38 Archaeology Island

More than 4,000 years of history in only 16 square miles

BY ANDREW LAWLER

44 A Stunning Sacrifice

Why were hundreds of valuable objects thrown into a Polish bog more than 1,500 years ago?

BY ANDREW CURRY

49 A Soldier's Story

The battle that changed European history, told through the lens of a young man's remains

BY JARRETT A. LOBELL

53 A series of steps climb the mountainside near Preah Vihear, an ancient Khmer temple complex that overlooks the Cambodian plain. Preah Vihear is at the center of a violent border dispute between Cambodia and Thailand.

Cover: Among the objects found in a 1,200-year-old tomb at the site of Atzompa in southern Mexico was this figurine, which may depict a war leader of the Zapotec culture.

COURTESY HÉCTOR MONTAÑO-INAH

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AMERICAN FOREIGN
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12



16



18

departments

4 Editor's Letter

6 From the President

8 Letters

When pharaohs reigned, the rehabilitation of Richard III's image, and the bent cross versus the swastika

9 From the Trenches

How social media saved a medieval Irish crannog, the death of a Medici mercenary, inside a Maya tomb within Palenque's Temple 20, and a group of discoveries add up to an ancient cocktail party

22 World Roundup

Correcting the record on Tycho Brahe, a 2.5-mile-long labyrinth among Peru's Nazca Lines, Ramesses III may have been the victim of a "Harem Conspiracy," and northwestern India identified as the birthplace of the Romani

53 Letter from Cambodia

A territorial dispute involving an 1,100-year-old Khmer temple on the Thai-Cambodian border turns violent

68 Artifact

Scientific analyses and experimental archaeology determine that mysterious, 1,000-year-old balls of clay found at a Yucatán site were used in cooking

on the web

■ **Our New Website** We gave our website a facelift. Check out our new look and turn to the Editor's Letter to read about the redesign

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In Plain Site

The editors of *ARCHAEOLOGY* are proud to announce the launch of our newly redesigned website, Archaeology.org. We invite you to join the hundreds of thousands of people who visit the site each month. It offers a visually exciting platform for the kinds of stories that our readers have come to expect. In addition, our daily Archaeological Headlines continue to keep everyone up to date on exciting discoveries between issues. We know you'll enjoy it!



This issue of *ARCHAEOLOGY* shows that evidence of conflict and war can be seen in the archaeological record in myriad—and sometimes surprising—ways. In “Munich Underground” (page 24), contributing editor Andrew Curry brings us a view of research that has gone on in the Marienhof neighborhood at the center of the city. Ironically, evidence dating from the twelfth to the mid-twentieth century was preserved for archaeological study by the destruction visited upon it in WWII. Now, archaeological excavation preceding the planned construction of a new subway station is revealing much about the Marienhof’s medieval past.

“Pirates of the Original Panama Canal” (page 30), by deputy editor Samir S. Patel, surveys archaeology at the mouth of the Chagres River

on Panama’s Caribbean coast. There, in 1671, notorious privateer Henry Morgan began his attack on Panama City, but lost several of the ships in his fleet. Cannons have already been found, and researchers hope to find remains of the ships themselves.

“A Stunning Sacrifice” (page 44), another article by Andrew Curry, examines how and why more than 400 extraordinary artifacts of a military nature—including swords, spears, and chain mail—ended up at the bottom of a Roman-era bog. This surprising evidence has been found in a equally surprising location—a muddy field in northern Poland.

A different view of conflict comes through in executive editor Jarrett A. Lobell’s piece, “A Soldier’s Story” (page 49). The remains of one individual and the things he carried at the Battle of Waterloo reveal the personal side of war. Although we may not yet know his name, he is not entirely lost to history.

And finally, journalist Brendan Borrell traveled to the Thai-Cambodian border to examine the armed conflict and controversy over a 1,100-year-old Khmer temple. His story, “The Battle Over Preah Vihear” (page 60), demonstrates archaeology’s relevance both in uncovering evidence of an ancient culture and in preserving it.

Claudia Valentino

Claudia Valentino
Editor in Chief

ARCHAEOLOGY

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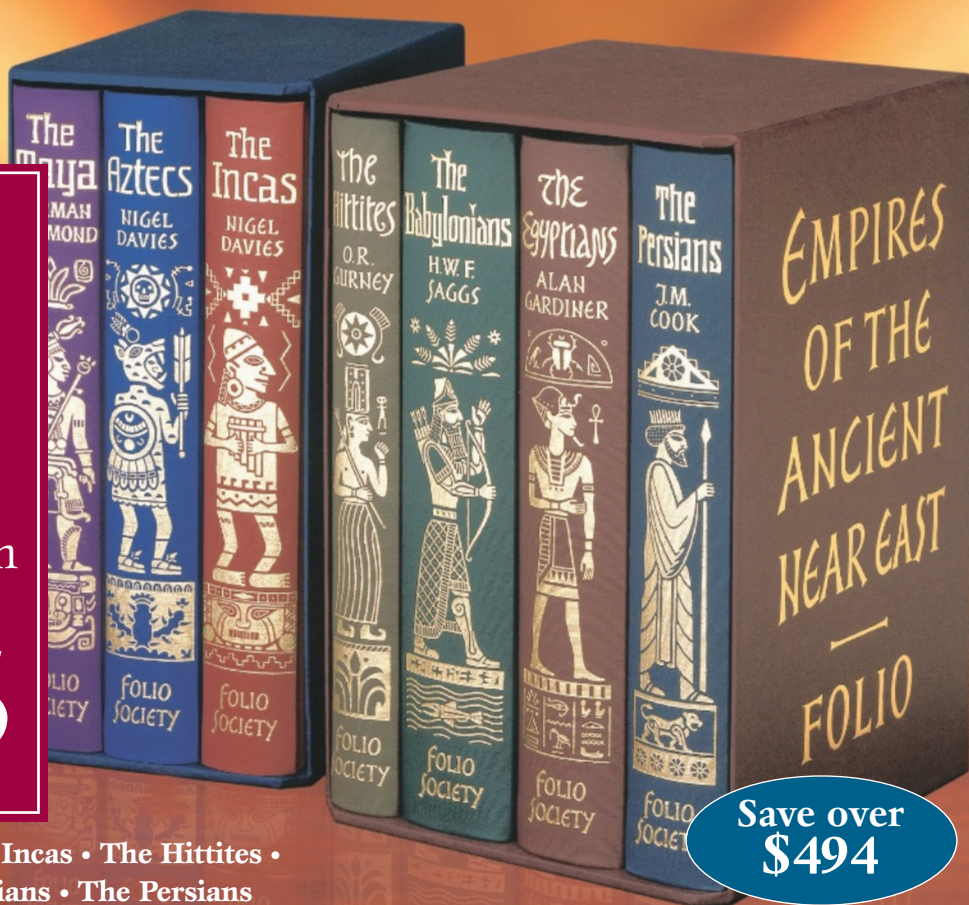
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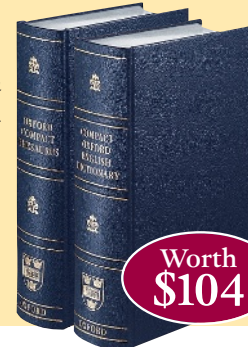
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Three Faces of American Archaeology

EACH YEAR AT OUR annual meeting, the Archaeological Institute of America observes a moment of silence in honor of members who have died during the prior year. Among the names I read at this year's ceremony were three archaeologists whose careers epitomized the practice of archaeology in postwar America. I remember them here.

Crawford Greenewalt, Jr., fondly known to friends and colleagues as "Greenie," directed excavations at Sardis in present-day Turkey (ancient Anatolia) for more than 30 years. When you include additional summers spent as an excavator and photographer, he worked at the site for nearly 60 years. Although born to wealth and privilege, he devoted his life to a relatively spare routine of digging, teaching, and research. Greenewalt was one of the world's leading experts in the archaeology of the Lydians, an ancient people last ruled by King Croesus, who made Sardis his capital. Greenewalt uncovered important remains of early citadel walls, as well as the furnaces used in antiquity to smelt ores and process gold.

Evelyn Byrd Harrison was born to an old and distinguished Virginia family that claimed descent from Pocahontas. In the 1940s, as a young student proficient in Greek and Latin, she was enlisted to put her obvious language abilities to work learning Japanese to translate intercepted war messages. In her early career, Harrison worked with William Bell Dinsmoor and other greats of Greek archaeology, whose ranks she joined. Like Greenewalt, she spent nearly her entire professional career working at one site, in this case the Agora of ancient Athens. For decades she was a key member of the Agora team supported by the American School of Classical Studies at Athens, and ensured that its work—and the field of Greek archaeology she influenced—had a strong component of formalist art history.

Gerhard M. Koepfel was born in Germany but emigrated to the United States as part of a wave of foreign, mainly German, scholars hired in the great university expansion of the 1960s. Having studied with the renowned scholar of Roman art Heinz Kähler, Koepfel helped establish Roman art and archaeology in the U.S. as a serious subject on a par with the study of ancient Greece.

As individual as they were as archaeologists, each nonetheless embodies a larger aspect of the practice of archaeology in postwar North America that today is rapidly disappearing. Greenewalt and Harrison, spending virtually their entire careers at a single site, both participated in decades-long projects largely focused on the excavation of monumental, elite public buildings. Today, financial constraints and local sentiments tend to preclude such "big digs." The foreign-trained Koepfel descended from an Old World intellectual tradition with roots in the nineteenth century that has now, likewise, largely disappeared. With their passing, we reflect on the loss of values and practices that played a fundamental role in the development of archaeology here and abroad for more than a century.



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LETTERS

The Times of the Pharaohs

Regarding “Gateway to the Netherworld” (January/February 2013), the pharaohs Seti I and his son Ramesses II were inadvertently assigned to the nineteenth century B.C. In fact, both were New Kingdom pharaohs. Seti’s reign began in the late fourteenth century B.C., whereas Ramesses took over upon his father’s death and reigned through most of the first two-thirds of the thirteenth century.

Elwyn C. Lapoint, Ph.D.

Eastern Washington University
Cheney, WA

Rehabilitating Richard

Having just finished Thomas B. Costain’s *The Last of the Plantagenets*, I feel that his arguments, that Richard was desperately wronged by biased “historians,” helped start Richard III’s reputational rehabilitation. Thus, I was thrilled to read Samir S. Patel’s balanced and in-depth article “The Rehabilitation of Richard III” in the January/February 2013 issue. Shakespeare, in his play *Richard III*, simply portrayed the insidious “His Royal Hatefulness” as explained and embellished by the royal historians of Richard III’s successors. Thanks to the archaeologists who’ve perhaps dug up Richard’s bones, Costain, and your magazine for helping stop poor Richard’s body from continuous mad twirling in his grave.

Susan B. Jones

Maryville, TN

Early Human Commerce in Europe?

Could the artifact production-rich rock shelters at Abri Blanchard and Abri Castanet be extremely early examples of commercial enterprise?

ARCHAEOLOGY welcomes mail from readers. Please address your comments to ARCHAEOLOGY, 36-36 33rd Street, Long Island City, NY 11106, fax 718-472-3051, or e-mail letters@archaeology.org. The editors reserve the right to edit submitted material. Volume precludes our acknowledging individual letters.

Even the cache of carved plaques found there might be portable art/ritual objects mass-produced for barter. We see evidence of trade in objects from places far away at the site. Perhaps these rock shelters were but two of many factory/markets saved for posterity by a sudden ceiling collapse.

Susan Weikel Morrison

Fresno, CA



Swastika or Bent Cross?

Your article titled “Nazi Iron Man Buddha?” (January/February 2013) displays the bent cross, which has appeared in Asian and Native American cultures for more than a thousand years. The German swastika “stands” up on its edge. It is the reverse image of the bent cross.

Don Leidig

Otego, NY

Deputy editor Samir S. Patel responds:

Indeed, the swastika on the disputed statue faces left, while the Nazi version faces right—and stands on its edge. Experts, however, do not believe the orientation of the symbol indicates whether the statue is centuries or decades old—a modern sculptor would also likely have been aware of this difference, and could have oriented the symbol to make the statue appear more authentic.

From the Trenches

LATE-BREAKING NEWS AND NOTES FROM THE WORLD OF ARCHAEOLOGY

Saving Northern Ireland's Noble Bog



A wicker wall lies atop the remains of a medieval house.

Digital activism carried out by a group of local archaeologists in Northern Ireland has led to the excavation of a significant site that would otherwise have been overlooked. In addition, the campaign has spurred an investigation into cultural heritage management practices and archaeological protocols in the region.

One of the best-preserved rural medieval settlements in the British Isles, the site, in Drumclay, was uncovered by archaeologists excavating a bog in the path of road construction. Working for the Northern Ireland Environment Agency, archaeologist Nora Bermingham and her team have shown that from the eighth to sixteenth centuries, the bog was a lake where generations of a noble Gaelic clan maintained an artificial island that measured some 260 feet across. Known as crannogs, such man-made islands were constructed by medieval elites throughout Scotland and Ireland for both defensive purposes and to broadcast a family's high status.

Few have been excavated since the 1930s, and none on the massive scale of the Drumclay site.

Previously excavated crannogs held up to five dwellings each, but so far Bermingham's team has discovered the remains of more than 30 wooden buildings that span the site's 800-year history. The family associated with it probably maintained five structures on Drumclay crannog at any one time, give or take, and about 30 people would have lived there. Though the crannog was marked on nineteenth-century maps and archaeologists scouting the proposed road route noted its presence, little was done to study or preserve it until last summer, when a limited six-week dig was organized by the Northern Ireland Roads Service. Concerned that authorities were preparing to shut down excavation of a major site before it had been properly studied, archaeologists on the project leaked information and photos from the dig to former medieval archaeologist Robert Chappelle, who posted them to his blog. Local archae-

FROM THE TRENCHES

ologists then launched a robust social media campaign to encourage the government to allocate more time and resources to the excavations. In July, Minister of the Environment Alex Attwood visited the dig and declared a “no go” zone around the crannog, limiting construction activity at the site. He later extended the excavation’s deadline until December, and then again until March 2013, giving Bermingham and her team time to explore the settlement fully.

Bermingham will use copious environmental samples to reconstruct what conditions were like for the families that lived on the crannog. “We know their houses were damp and dank



places,” she says, “but we want to get much more detail, to the level of what parasites were bugging them and what the microenvironmental differences were between the different buildings.” Amid the remains, the team has recovered more than 4,000

objects, including leather shoes, gaming pieces, delicate combs, and Bermingham’s favorite artifact: a wooden cheese mold with a cross incised on the bottom. “The quantity of material means we’re able to seriously review how early medieval Irish society functioned,” says Bermingham. “We can also compare our archaeological evidence with documentary sources such as the

Annals of Ulster and the *Lives of Irish Saints*.” Some of the same medieval records could eventually give researchers the family name of the Drumclay crannog clan.

In the aftermath of what many regarded as a crisis, Attwood has asked University of Dublin archaeologist Gabriel Cooney to review the circumstances that almost resulted in the loss of one of the region’s most important sites and to make recommendations for changes in how the government handles archaeological investigations in advance of road construction. “Drumclay crannog is a very important site in and of itself,” says blogger Robert Chappelle, “but its longer-term value may be to help change how we do archaeology in Northern Ireland.”

—ERIC A. POWELL

OFF THE GRID

Even as the flame cauldron from the London 2012 Olympic Games cools, excitement is building for the 2016 Games in Rio de Janeiro, Brazil. Much as in London (“London 2012,” July/August 2012), construction and beautification projects around Rio are revealing the city’s past. Experts were aware of the historical significance of the run-down port near the center of town, so when redevelopment of the site began, so did an archaeological project. Excavations uncovered Empress Wharf (Cais da Imperatriz), so named to commemorate the arrival of Princess Teresa Cristina of the Two Sicilies to marry Emperor Dom Pedro II in 1843. Beneath it was another site, Valongo Wharf (Cais

do Valongo). Built in 1811, it was the disembarkation point for at least 500,000 enslaved Africans after their journey across the Middle Passage. In total, some four million Africans were shipped to Brazil between 1550 and 1888. Head archaeologist Tania Andrade Lima, of the Museu Nacional/Universidade Federal do Rio de Janeiro, says that Valongo represents a crucial part of the city’s history that had long been erased or concealed.

The site

Valongo was a slave mercantile complex that included, in addition to the wharf, warehouses, markets, a quarantine station, and a cemetery. The excavation focused on pavements and two portions of the site where waste from both the upper classes and slaves accumulated: a natural rainwater drainage area adjacent to the wharf and the once-submerged area in front of the wharf. Tens of thousands of objects



were unearthed, many of which were either taken from slaves, or lost or hidden by them. The finds include delicate bracelets, rings woven from vegetable fiber, charms, lumps of amethyst and stones used in African worship, and cowrie shells, then common currency in Africa. In 1843, Valongo and its brutal history

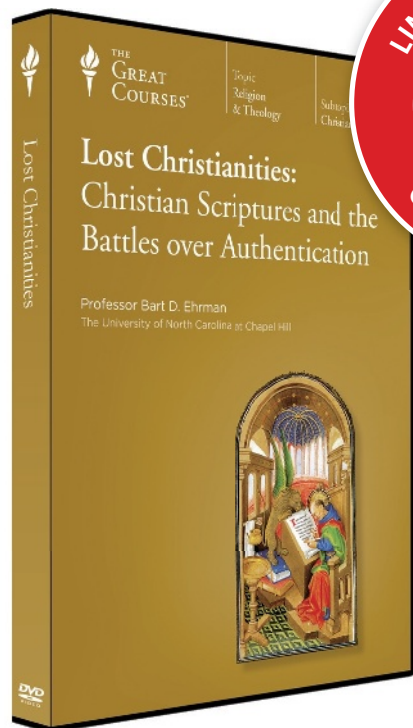
were paved over for the arrival of the princess. Now, the city plans to restore that history. A new square displays the exposed remains of the Valongo Wharf and the Empress Wharf as an open-air museum dedicated to an examination of slavery and the African diaspora. The objective of this urban archaeology was to rescue the wharf from oblivion, says Lima, and to celebrate the ways that Africans have enriched Brazilian culture.

While you’re there

Visitors to Rio are sure to find beautiful beaches and wonderful food. A cable car ride up Sugar Loaf Mountain provides panoramic views of the city. The statue of Christ the Redeemer on the Corcovado is one of the wonders of the world, and the city is full of historic churches and museums.

—MALIN GRUNBERG BANYASZ





How Has Christianity Changed over 2,000 Years?

In the first centuries after Christ, there was no “official” New Testament. Instead, early Christians read and fervently followed a wide variety of scriptures—many more than we have today.

Relying on these writings, Christians held beliefs that today would be considered bizarre. Some believed that there were 2, 12, or as many as 30 gods. Some thought that a malicious deity, rather than the true God, created the world. Some maintained that Christ’s death and resurrection had nothing to do with salvation while others insisted that Christ never really died at all.

What did these “other” scriptures say? Do they exist today? How could such outlandish ideas ever be considered Christian? If such beliefs were once common, why do they no longer exist? These are just a few of the many provocative questions that arise from **Lost Christianities: Christian Scriptures and the Battles over**

Authentication, an insightful 24-lecture course taught by Professor Bart D. Ehrman, the Chair of the Department of Religious Studies at the University of North Carolina at Chapel Hill and the author and editor of 17 books, including *The New York Times* bestseller *Misquoting Jesus*.

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Mussel Mass in Lake Ontario



1982

For the last 25 years, invaders have staked an ever-more-alarming claim to the Great Lakes. Zebra and quagga mussels, small molluscs native to eastern Europe, are a serious problem in bodies of freshwater through-



2006

out the Midwest. They have colonized and blocked water pipes, and can lead to the breakdown of dock pilings and even steel and concrete. The ongoing invasion has underwater archaeologists concerned about the fate of the lakes' many historic

wrecks. This concern led Parks Canada and the city of Hamilton, Ontario, to begin a new effort to examine the wrecks of *Hamilton* and *Scourge*, two merchant ships that were pressed into military service in the War of 1812 and sank in a sudden squall in 1813. Recent surveys using sonar and remotely operated vehicles have revealed significant infestation of the well-preserved wrecks. The quagga mussels present a long-term preservation concern, and they also conceal the wrecks (even though, ironically, they tend to make the water clearer), making the sites increasingly difficult to study and assess.

—SAMIR S. PATEL

Europe's First Carpenters

Researchers in Germany have discovered four wells more than 7,000 years old. The wells, all underground constructions of hewn oak, are evidence that Neolithic inhabitants of central Europe were accomplished carpenters, capable of felling and working trees three feet thick into planks, then carefully fitting them together. One of the wells, found near the town of Altscherbitz, was removed from water-logged soil in a single 70-ton block and transported to Dresden, where archaeologists "excavated" it in a lab.

There, analysis revealed that the ancient well-builders constructed tusk mortise and tenon joints, a technique that uses a fitted wedge to lock the pieces in place, in the base frame, with the rest constructed in "log cabin" style. "We know the Romans could do it, but that they were in use 5,000 years earlier really came as a surprise," says Rengert Elburg, an archaeologist at the Saxon Archaeological Heritage Office in Dresden.

The 151 pieces of wood recovered from the wells are also an invaluable source of data for dendrochronologists, who compare tree rings to date artifacts and learn more about past climate conditions. Tree rings suggest the Altscherbitz well was in use for less than a decade before it was deliber-



ately filled with 26 intact pots, thousands of pot fragments, and organic materials including early grains such as emmer and einkorn, strawberries, hazelnuts, and black henbane, a powerful hallucinogen. According to Elburg, the discovery of the pots was particularly surprising. "We don't normally find intact pots from the Neolithic," says Elburg. "If you find 26 complete ones, you know it was a ritual deposition. Perhaps it was a well for ritual water or special drinking."

—ANDREW CURRY

Medici Mystery

An investigation into the tomb of the Medici warrior known as Giovanni dalle Bande Nere (“of the Black Bands”), born Lodovico de Medici in 1498, has raised new questions about the famous mercenary’s death. Giovanni earned a fierce reputation early on in life; he was reportedly exiled from Florence at the age of 12 for committing murder. However, his war-like character allowed him to excel as a prominent military captain under the early-sixteenth-century Medici popes, Leo X and Clement VII. He acquired the nickname “dalle Bande Nere” after adding black stripes to his insignia to mourn the death of Pope Leo X in 1521.

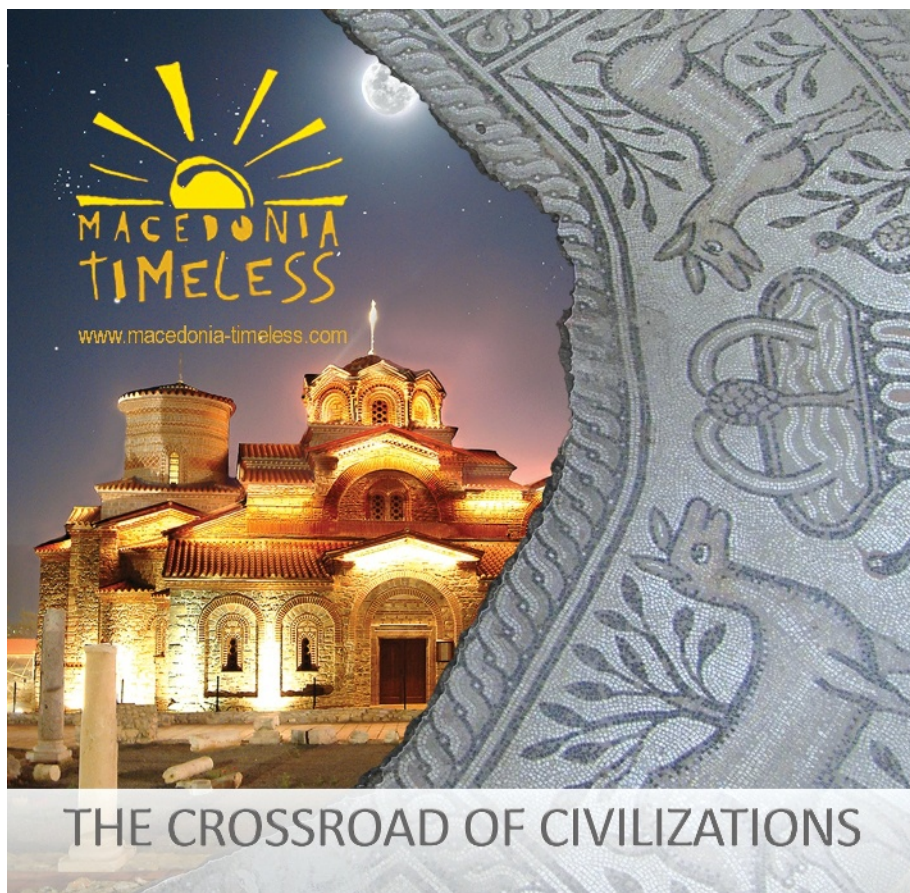
Contemporary Italian accounts of Giovanni’s death indicate that he was struck by a cannonball in 1526. These sources state that his wounds required the amputation of his right leg above



the knee, and that he died shortly thereafter, possibly from gangrene resulting from surgery. The Renaissance warrior’s remains have

recently been exhumed from the Medici Chapels in Florence. Surprisingly, the bones show that the traditional accounts of his death may not be entirely accurate. Only the lower leg and foot were removed, and the femur was intact. Currently the skeleton is being studied by a team at the University of Pisa led by paleopathologist Gino Fornaciari. “We have already learned that he was a very vigorous man, about 5 foot 8 inches tall, and with evidence on his bones that since adolescence, he carried extremely heavy armor and was often mounted on a horse,” says Fornaciari. “With further study we hope to clarify how Giovanni was wounded and the type of surgical intervention that took place, as well as reconstruct more details about the lives of the Medicis.”

—JASON URBANUS



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Deconstructing a Zapotec Warlord Figurine

The site of Atzompa in southern Mexico was a suburb of the great Zapotec capital city of Monte Albán 1,200 years ago, when a man and a woman were laid to rest there in an elaborately painted tomb (“High Rise of the Dead,” November/December 2012). Recently, a team from Mexico’s National Institute of Anthropology and History finished excavating a colorful figurine from among the objects left with the deceased. Some researchers believe it may be an image of the man buried there, or of one of his ancestors. Interpretation of the figurine’s clothing, jewelry, and vivid coloration has much to say about Zapotec culture.

The seated statue is more than 30 inches tall and wears an elaborate headdress that would have been part of a costume symbolizing a person’s name and station within Zapotec society. According to Marc Zender, an expert in Mesoamerican iconography at Tulane University, painted figurines similar to this one were not rare among the Zapotec, but the variety of pigments used on this one seems to be something special.

A bar with three dots on the figurine’s apron is a glyph that represents the number eight. Above that is a circular glyph that means “earthquake” or “tremor.” Zender explains that the symbols spell out the day in the Zapotec ritual calendar when the person was born, and would also have been his name: Eight Tremor.



Tomb at Atzompa

The figurine’s vibrant colors carry other important meanings. Images of people, as opposed to those of gods, were usually painted red in Zapotec artwork, Zender says. The greenish circular ornaments on the figurine’s ears, called ear spools, were fashionable among nobles of the neighboring Maya. Their color suggests they may depict spools made of jade, which would have been acquired through trade with the Maya. “It speaks nicely of how dialed in Monte Albán was to widespread trade routes,” says Zender.

Spreading out to either side of Eight Tremor’s head are green feathers that likely represent those of the quetzal birds that live in the cloud forests of Guatemala. Above those sits a brilliant red headdress depicting a mythological fire serpent. According to Zender, this was a symbol worn by war leaders across Mesoamerica. Its roots can be traced to the ancient city of Teotihuacán, 280 miles north of Atzompa, and the symbol had been in use for at least 500 years before the figurine was buried.

Zender also notes that pigments have often disappeared by the time artifacts are unearthed. “Color is really more common than we think,” he says. The Zapotec clearly had a tradition of painting figurines in monochrome, but, Zender adds, “this one, where all the colorful details are picked out, is like a mural come to life.”

—ZACH ZORICH

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Messages from Quarantine

The North Head Quarantine Station near Sydney, Australia, was used to isolate people—usually newly arrived immigrants—suspected of carrying infectious disease. Between 1828 and 1984, 13,000 people passed through the station (more than 500 never left and were buried on site). Some of these people left records of their stays in the form of inscriptions on two sandstone outcrops at the site. The more than 1,000 inscriptions include everything from names and initials to medallion-like carvings to commemorative plaques. Many contain information about ships and their passengers. “They provide a material portal through which we can access something of the stories of the ordinary men, women, and children who migrated to Australia,” writes Annie Clarke of the University of Sydney. A more recent addition, likely from well after the site became a park, reads: “Rebecca will you marry me? Tim.” Good thing he signed it to avoid any confusion.

—SAMIR S. PATEL



Let Slip the Pigeons of War



Colin Hill, a member of the Royal British Pigeon Racing Association, was astounded to learn last year that in the 1980s, the remains of a WWII courier pigeon were discovered in the unused chimney of a home near London. Among the doomed homing pigeon's bones was a container holding a message consisting of 27 five-letter codes. Hill, also the curator of the pigeons exhibition at Bletchley Park, home of Britain's wartime code-breaking effort, knew that the birds were often trusted with

urgent military communications, so he couldn't believe the discovery had gone unnoticed for three decades. Hill lobbied the GCHQ—the British equivalent of the National Security Agency—to decode the message, which may have been sent during the D-Day landings.

The government has declared the code unbreakable, but perhaps the heroic columbid didn't die in vain. Its last mission has focused worldwide attention on the legacy of Allied homing pigeons. More than 250,000 saw active service in WWII, and 32 received the Dickin Medal, the highest British military award offered to animals. Among them was “G.I. Joe,” an American bird whose timely delivery of a message helped save 100 British lives in Italy. His stuffed remains are on display at Fort Monmouth, New Jersey.

—ERIC A. POWELL

The First Spears

Analysis of 210 stone tools from the site of Kathu Pan in South Africa shows that people were probably hunting with stone-tipped spears by about 460,000 years ago, roughly 200,000 years earlier than previously believed. The study, led by University of Toronto doctoral candidate Jayne Wilkins, confirmed that the tools had broken in ways similar to other stone spear points that have been thrust or thrown into the bodies of animals. In addition, 23 of the tools appear to have been thinned at their bases to make them easier to attach to the shaft of a spear. To test their interpretation, the team made 32 replicas of the tools from Kathu Pan, hafted them to wooden dowels, and fired them into springbok carcasses using a crossbow that allowed for precise control of force. The replica spear points were damaged in ways similar to their ancient counterparts. The early date for the tools also suggests that the first stone-tipped spears were used by *Homo heidelbergensis*, the species of human that was the ancestor of both Neanderthals and modern humans.

—ZACH ZORICH



How to Outsmart a Millionaire

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I wasn't looking for trouble. I sat in a café, sipping my espresso and enjoying the quiet. Then it got noisy. Mr. Bigshot rolled up in a roaring high-performance Italian sports car, dropping attitude like his \$14,000 watch made it okay for him to be rude. That's when I decided to roll up my sleeves and teach him a lesson.

"Nice watch," I said, pointing to his and holding up mine. He nodded like we belonged to the same club. We did, but he literally paid 100 times more for his membership. Bigshot bragged about his five-figure purchase, a luxury heavyweight from the titan of high-priced timepieces. I told him that mine was the **Stauer Corso**, a 27-jewel automatic classic now available for only \$179. And just like that, the man was at a loss for words.

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Burials and Reburials in Ancient Pakistan

When development work began on a parcel of land in the village of Udegram in Pakistan's Swat Valley, the landowner likely never imagined that he would find a human burial. Soon a team of archaeologists, working with funding from the Archaeology, Community, and Tourism Project of the Pakistani-Italian Debt Swap Program, persuaded him to stop building for a year while they excavated the site. They uncovered not just a lone burial, but more than 30 graves that are approximately 3,000 years old. Many of the burials have two skeletons, which Luca Maria Olivieri of the Italian Archaeological Mission, one of the archaeologists working on the site, believes is evidence of a complex funerary ritual. "This [ritual] involved decomposition in graves enclosed in wooden fences, reopening of the graves for a second burial and partial burning of the bones, sealing the graves, and, finally, the construction of a burial mound," says Olivieri. The burials contain a great many grave goods, including high-quality ceramics, cloth, copper and bronze pins, ivory spindles, and chlorite spinning whorls.

—JARRETT A. LOBELL

Life (According to Gut Microbes)

Each of us is home to a vibrant community of gut microbes, the bacteria that live in our digestive systems. Because these bacteria often reflect the diets of their hosts, scientists are examining coprolites—fossilized feces—to learn more about the microbiomes, and lives, of ancient humans.

For instance, the abundance of the bacteria *Bifidobacterium breve*—commonly found in the stool of recently breastfed children—in a 1,400-year-old sample taken from La Cueva de los Chiquitos Muertos ("The Cave of Dead Children") in northern Mexico suggests the coprolite had come from a young child. The sample also contained a large quantity of a bacteria called *Prevotella*, which indicates a diet heavy in carbohydrates but relatively low in proteins.



The sample also contained a large quantity of a bacteria called *Prevotella*, which indicates a diet heavy in carbohydrates but relatively low in proteins.

Cecil M. Lewis, Jr., a molecular anthropologist at the University of Oklahoma, and his team also found *Treponema* in both ancient samples and modern rural populations. He thinks this implies that both groups have diets heavy in raw, fibrous foods. The microbe, however, does not appear in the stool of urban or Western populations, which might be attributable to more sanitary living conditions. "As we learn more about how well these microbiome profiles predict aspects of the human condition," says Lewis, "we can use the information to better understand the past."

—NIKHIL SWAMINTHAN

Mapping Maya Cornfields

Archaeologists have wondered for decades how the ancient Maya, who maintained large cities in hilly territory covered with rain forest and thin soil, were able to produce enough food to support their numbers. "That's the Maya mystery," says Richard Terry, a Brigham Young University soil scientist whose work explores the agricultural methods of the civilization. In an excavation at Tikal, Guatemala, once a Maya settlement of some 60,000 people, Terry's interdisciplinary team is constructing a map of where and when the 115-square-mile site was planted with corn, one of the Maya's staple crops. Corn leaves distinctive traces in the soil, which the team revealed using mass spectrometry. Understanding how the Maya made use of the land could reveal how they fed their large populations and whether agricultural shortfalls hastened the decline of the civilization.



The findings, published in the *Soil Science Society of America Journal*, show evidence that the Maya planted corn in lowland areas where there was more soil, and that agriculture gradually spread up-slope to thinner soils, where erosion eventually undermined productivity. The next question, says Terry, is whether the Maya developed the capability to cultivate corn in the low-lying wetlands, or *bajos*, that ring the site. If the Maya did possess a "lost technology" for growing corn in swampy conditions, the Maya crop mystery could constitute a new puzzle, as well as, perhaps, prove useful to modern agriculture.

—KATHERINE SHARPE



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Inside a Painted Tomb



A team of archaeologists from Mexico's National Institute of Anthropology and History has entered a brilliantly painted Maya tomb inside Palenque's Temple 20, 13 years after it was first discovered, following consultation with dozens of specialists

on how best to conserve the find. The tomb is believed to hold the remains of K'uk Bahlam I, the founder of the city's ruling dynasty, who came to the throne in A.D. 431. In 2011, a camera was lowered through a small hole in the tomb's ceiling, providing a tantalizing glimpse

of the murals ("A Peek Inside Two Secret Chambers," September/October 2011). The paintings, which may depict the nine lords of the Maya underworld, will be stabilized and conserved before the tomb is further excavated.

—ZACH ZORICH

Minoan Mountaintop Manse

In 1898, archaeologist Sir Arthur Evans visited a small plateau near the town of Ierapetra in southeastern Crete, where he documented in his now-lost diary the remains of a Minoan fort. For almost a century there was no further exploration of the site, called Anatoli, until last summer, when a team from the University of Athens began digging there. Over more than a month, the team unearthed new evidence suggesting that the structure was not, in fact, a defensive fort, but rather a well-preserved two-story villa dating to the New Palace period (1600–1450 B.C.). In addition to walls more than seven feet high, archaeologists also uncovered an impressive stone facade, a room filled with large storage *pithoi* (ceramic containers), a rock-crystal bead, a bronze ax, and a pillar crypt—a distinctively Minoan ritual structure. Rural villas of this type have been uncovered in Crete before, but they were all situated in the lowlands and plains. Thus the Anatoli villa, at almost 9,000 feet, is only the second to be found at such a high altitude. Excavation director Yiannis Papadatos suggests that it likely functioned as a regional administra-



tive and economic center. Until now, Minoan scholars have focused largely on the island's lowlands and coastline. In the coming seasons, the team hopes to further explore the role of Minoan mountaintop settlements.

—YANNIS STAVRAKAKIS

A Prehistoric Cocktail Party

The 2012 holiday season brought news of several exciting finds from across Europe that make up a veritable cocktail party—including wine, beer, and cheese—of archaeological evidence.

In a 2,000-year-old, 100-foot-deep well at the site of Cetamura del Chianti in Tuscany, Italy, archaeologists from Florida State University found 153 grape seeds. The pips date to the period shortly after the Romans claimed the site from the Etruscans. The researchers have identified the grapes as *Vitis vinifera*, or the wine grape. Because the seeds were not burned, they might carry preserved DNA that could offer insight into the beginnings of viticulture in the region now famous for its bold, fruity reds. "People are going to be interested in the variety of grapes we might be able to identify," says archaeologist Nancy Thomson of Grummond.

Meanwhile, in western Cyprus, a domed, mud-plaster structure found at the site of Kissonerga-Skalia appears to have been used as a Bronze Age kiln to dry malt for brewing beer. Archaeologist Lindy Crewe of the University of Manchester in England and her team excavated the nearly 4,000-year-old oven, uncovering ashy deposits containing carbonized fig seeds, mortars and other grinding implements, and juglets. They also found sherds of a large clay pot that they believe was a *pitbos*, a vessel in which a fire was lit and used as an indirect heat source within the kiln. Malt, the team hypothesizes, might have been stored in the juglets while they were in the kiln, and then removed to perform the rest of the brewing process.

Finally, new data indicate that sherds from vessels used as sieves, dating back

to the sixth millennium B.C. in Poland, have residue of dairy fats on them, suggesting they were used in the earliest known instance of cheese-making. Researchers at the University of Bristol confirmed what Princeton archaeologist Peter Bogucki had suspected for 30 years—that Neolithic farmers in Europe

whose settlements were dominated by remains of cattle were dependent on those animals for more than meat.

Taken together, the finds, spanning thousands of years and distant locations, suggest that tastes may not have changed all that much over the millennia.

—NIKHIL SWAMINATHAN

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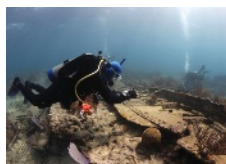


NORWAY: Around 1,300 years ago, Vikings grew marijuana—not for smoking, but for versatile hemp, used for making textiles and rope. Pollen from bog samples taken in the 1940s and 1950s and stored in a museum collection were found to contain higher-than-normal concentrations of hemp pollen. It is not known exactly how the hemp was used, as plant fibers don't preserve well in this setting, but it appears that the plants were laid out in the wet bog to prepare them for processing.



CZECH REPUBLIC: Analysis of the exhumed remains of 16th-century astronomer Tycho Brahe has put to rest a few of the most notorious tales about his life and death. Samples from his beard, bones, and teeth were

studied to determine if there is any truth to the rumor that he died from mercury poisoning. The samples don't contain deadly concentrations of mercury, suggesting that reports of death by bladder infection might be more credible. The researchers also found that Brahe's famous prosthetic nose (he lost the original in a duel over a mathematical formula) was made not of gold or silver, but of bronze.

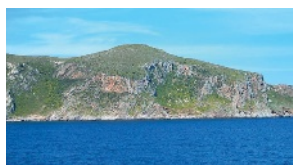


FLORIDA: Known locally as "Mike's Wreck," the remains of a ship six miles off the coast of Key Largo were unidentified until a new survey. The location and measurements of the wreck match those of *Hannah M. Bell*, a British steamer that grounded on Elbow Reef in April

1911, laden with coal bound for Mexico. The wreck itself became one of the Keys' many navigational hazards—the steamer *Quoque* wrecked on its remains in 1920.



PERU: A five-year study of the famed Nazca Lines, massive geoglyphs in the Peruvian desert, took a down-to-earth approach. Archaeologists walked the paths, which are between 1,300 and 2,100 years old, to see them perhaps as their makers once saw them. Among the finds is a previously unstudied labyrinth, 2.5 miles long, hidden in plain sight, and full of disorienting twists and turns. Walking such paths single file likely had some unknown ritual purpose.



ITALY: Today the islands of the Mediterranean are practically synonymous with seafood. But for some of the early residents, the bounty of the sea wasn't on the menu. Collagen analysis of human remains found in a

cave on Favignana, an island west of Sicily, shows that settlers there 20,000 to 25,000 years ago relied on land animals—deer and boar—rather than fish, even as rising seas isolated the island. They may have lacked well-developed fishing technology.



EGYPT: A papyrus in the Egyptian Museum tells of the "Harem Conspiracy," an attempt by one of the wives of pharaoh Ramesses III, Tiye, to murder her husband to put her son Pentawere on the throne. According to the papyrus, the plot was uncovered—but the fate of Ramesses III is left unclear. New CT scans of the pharaoh's mummy suggest something sinister was afoot—he clearly had his throat cut in 1156 B.C., and a Horus eye amulet was placed in the wound to enable his recovery in the afterlife. Researchers theorize that the "Harem Conspiracy" may have been a success after all.

INDIA: The Romani, once known as “gypsies,” are Europe’s largest minority group, with 11 million members. They speak a variety of languages and have a range of customs, but share a common



genetic heritage. A study of the DNA of 13 Romani groups from across the continent confirms what was suspected from linguistic analysis—that all the Romani hail from northwestern India, and migrated out approximately 1,500 years ago.



JAPAN: Examples of ancient Japanese armor have been found before, but never on the remains of their wearer. At the site of Kanai Higashiura,

archaeologists have found the skeletons of an infant and an armor-clad warrior, both entombed in ash from a volcanic eruption in the early sixth century. This type of armor, made of small overlapping metal plates, is sometimes found among grave goods. The style suggests he may have been an elite warrior or a guard at an elite residence.



TONGA: The site

of Nukuleka in Tonga is the oldest known site occupied by the Lapita peoples who initially settled remote Oceania, but it has been difficult to date the first settlement precisely. Scientists have now used uranium-thorium dating on thirteen small coral files to find that people of the Lapita culture arrived between 2,830 and 2,846 years ago, nailing down the founding event of Polynesia with unprecedented precision.



NEW ZEALAND: Archaeological sites are often described as “time capsules,” but rarely does the term apply as well as it does to a recent discovery in Christchurch. In the foundations of an office building—demolished as part of the recovery after the city’s deadly 2011 earthquake—archaeologists found a room containing 1,600 artifacts from the 19th century, including a lady’s tiny pocket watch, a pot of ointment, and a variety of pottery and glass fragments.

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Munich



In preparation for construction of a new subway line running through Munich's city center, archaeologists work to uncover the story of the Marienhof. This neighborhood contains evidence from nine centuries of Munich's past, including a 19th-century police headquarters.

Underground

**A metropolis' modern needs help
reveal its hidden history**

by **ANDREW CURRY**



On December 17, 1944, an Allied bombing raid killed 562 people and reduced much of central Munich to rubble. The destroyed areas included a densely built neighborhood of government buildings, cafés, and hotels called the Marienhof, located in the city's historic center just behind the nineteenth-century town hall and nearby square. A few weeks later, more than 400,000 incendiary bombs rained down, incinerating the ruined buildings.

Years passed before the remains were cleared, and eventually the neighborhood was paved over and turned into a parking lot. Over the next half century, as Munich recovered from the war, it became one of Germany's wealthiest and most dynamic

and see the entire history of Munich—the early city defenses, evidence of the first citizens who settled here, and even ventilation shafts built before the war,” says Behrer. In particular, the dig has revealed a wealth of information about Munich's rapid growth in the Middle Ages, a part of the city's story that has proved difficult to reconstruct from historical sources alone.

To prepare for excavation, Behrer combed the city's archives to guess what might lie underneath the square's surface. Marienhof's central location and the tight time frame made it important to try to eliminate any surprises. Although this wasn't the first time the site had been touched since the war—an earlier subway line and a modest press center, both built for the 1972 Olympic Games, had been constructed on parts of the site—no attention had ever been paid to the possible archaeological remains there. At that time, no law required archaeological investigations to take place before building projects began. Thus Behrer started with a nearly blank page. “How deep could the walls be, what areas would have been the most intensively built, would there be wartime debris, how much dirt would we have to haul away? The builder needed to know everything that might become an issue before starting,” Behrer says. “You can't just dig—you have to do a tremendous amount of preplanning.”

As the chimes of Munich's famed Marienplatz Glockenspiel rang out at noon on a Tuesday in May 2012, Barbara Wuehrer, one of the archaeologists working on the site, along with a half-dozen researchers and technicians, was busy documenting and photographing exposed walls, storm drains, and alleys just a few feet wide, some dating back centuries. In a few places, the

excavation trenches were nearly 15 feet deep. Thus far, many of the most compelling finds have come from narrow pits that were once latrines or wells. A whiff of long-ago Munich helps tell one from the other. “If it still stinks, it's a latrine,” says Wuehrer. “They really give a sense of what daily life was like in the Middle Ages.”



This medieval latrine was originally dug as a well in 1261 and produced some of the excavation's most interesting items, including a wooden box once used to store fish.

The Marienhof was home to many different types of buildings over its long history, including the “Institute of the English Lady” convent built in the 18th and 19th centuries.

cities. In the rush to rebuild, countless potential archaeological sites were lost to the construction of underground electrical lines, foundations for new buildings, and other necessary urban infrastructure. The ruins that lay underneath the parking lot were essentially forgotten.

Then, in 2011, archaeologists began digging into the Marienhof. This section of Munich might have stayed underground forever were it not for an expansion of the city's overburdened transit system. Authorities with the national rail company, Deutsche Bahn, are planning to build a new subway line running under the city center, with work starting in 2017. Marienhof will be the site of a large new station on that line. To prepare for the eventual construction, Deutsche Bahn hired Christian Behrer, an expert on the history of medieval Munich, to plan legally required archaeological investigations.

In a little over a year and a half, the archaeologists uncovered nearly nine centuries of Munich's past, from a time before the city even appears in written sources up to the night the bombs buried the neighborhood. “You can stand at the side of a trench





The Marienhof excavation has uncovered evidence of some of the first stone buildings in Munich, including this medieval wall, built around 1300.

The excavation at Marienhof tells the story of what urban planners today would call a “mixed-use neighborhood” that began before the city walls were even built in 1173. In fact, the project has shown that the walls were constructed to protect a settlement that was thriving before it was first recorded in history books as “Muniken” or “Munken,” and before the city’s founding charter was signed in 1158.

Once it was encircled by walls, a mix of merchants, tradesmen, and nobles eager to be as close as possible to city hall settled in. “It was a colorful neighborhood where patricians and craftsmen lived side by side,” says Behrer. “We can see the whole spectrum of medieval society from here.” For example, because the area’s houses were so close together, a workmen’s latrine was found just 10 feet from the cesspit of a rich medieval merchant’s house. Over the course of the last 700 years, the area was also home to a small cloister, a public bath, police headquarters, a café, and a library. A darker period of Munich’s past also left its mark: A synagogue and Jewish school occupied the center of the site from 1380 until the Jews were expelled from the city in 1442.

Beyond the low steel-wire construction fence that enclosed the dig, the city took little notice of the massive excavation, covering 2.5 acres, that went on in its midst. A scantily clad Esprit model looked down from a billboard at one end of the square. At the other end, a stylish food emporium bustled with midday shoppers. High above, the dark glass windows of luxury apartments overlooked the excavation’s piles of earth and temporary trailers. “There are lots of expensive shops and residences here, and people are very sensitive when there’s a lot of dust everywhere. If I paid a million and a half euros [\$2 million] for an apartment, I wouldn’t be eager to have a construction site outside either,” says Jochen Haberstroh, a department head at the Bavarian State Preservation Office, who was responsible for ensuring that the excavation was carried out properly. “It’s good that we came up with some solid results.”

Unlike many archaeological excavations, which proceed in layers from most recent on top to oldest on the bottom, the stratigraphy of urban excavations can be a knotty mess of mixed-up chronology. For centuries, residents of Munich who wanted more living space had to build additional stories on top of their houses or dig new cellars.

Thus, foundations of dwellings from the Middle Ages sometimes sit atop basements dug centuries later, and the city’s nineteenth-century sewer pipes run parallel to what was once a defensive moat around Munich’s twelfth-century outer walls. “The city was too small almost immediately, and overflowed its walls within a few decades of its founding,” says Haberstroh. “It was developing dynamically, even in the early years. I didn’t expect [to find] that at all.” Property boundaries, unchanged for centuries and preserved after the destruction of the war, have made it easy for archaeologists to tie house foundations to tax records in the city archives, sometimes even revealing the names and occupations of their long-ago owners. The house on the corner of



Remains of many of the neighborhood’s multistory residential structures, including these cellars, have also been uncovered.

Schramm and Diener streets, for example, was occupied by town clerk Peter Kruembel and his wine-merchant son in the late thirteenth century. Five hundred years later it was a hotel called the Blue Grape.

Last October, archaeologists took their final measurements and backfilled the Marienhof, smoothing the ground over to await construction of the subway. It will take them years to process all the evidence they gathered, and more surprises may yet emerge. But this could be the last dig of its kind Munich will ever see. There are precious few undisturbed spaces underneath the city, and none as central—or with as many layers of the past—as this unlikely parcel. “This is the biggest-ever city-center excavation in Munich, and probably in southern Germany,” Haberstroh says. “When we’re done, it’s gone.” The wealth of finds, some of which are shown on the following pages, will keep scholars busy for years, illuminating the history of Munich even as a new train line tunnels through its remains.

900 Years of History in the Marienhof



Almost a millenium of Munich's past has been uncovered in the Marienhof. Finds include:

- 1) Cups and dishes from the Café Deistler, which was destroyed during a WWII bombing raid
- 2) A 13th-century, six-foot-long box used for storing live fish
- 3) Large bone beads that may have been rosary beads, part of a necklace, or sewn onto clothing as decoration
- 4) A 15th-century drinking glass
- 5) Charred library books destroyed during the WWII bombing raid
- 6) A gold ring dating to the 15th century
- 7) A medieval ceramic coin bank
- 8) The battered remains of the Café Deistler's cash register
- 9) An "Emergency Exit" sign from a private WWII bunker
- 10) Cherry pits and walnuts found in a latrine
- 11) Early 15th-century leather shoes

Andrew Curry is a contributing editor at ARCHAEOLOGY.

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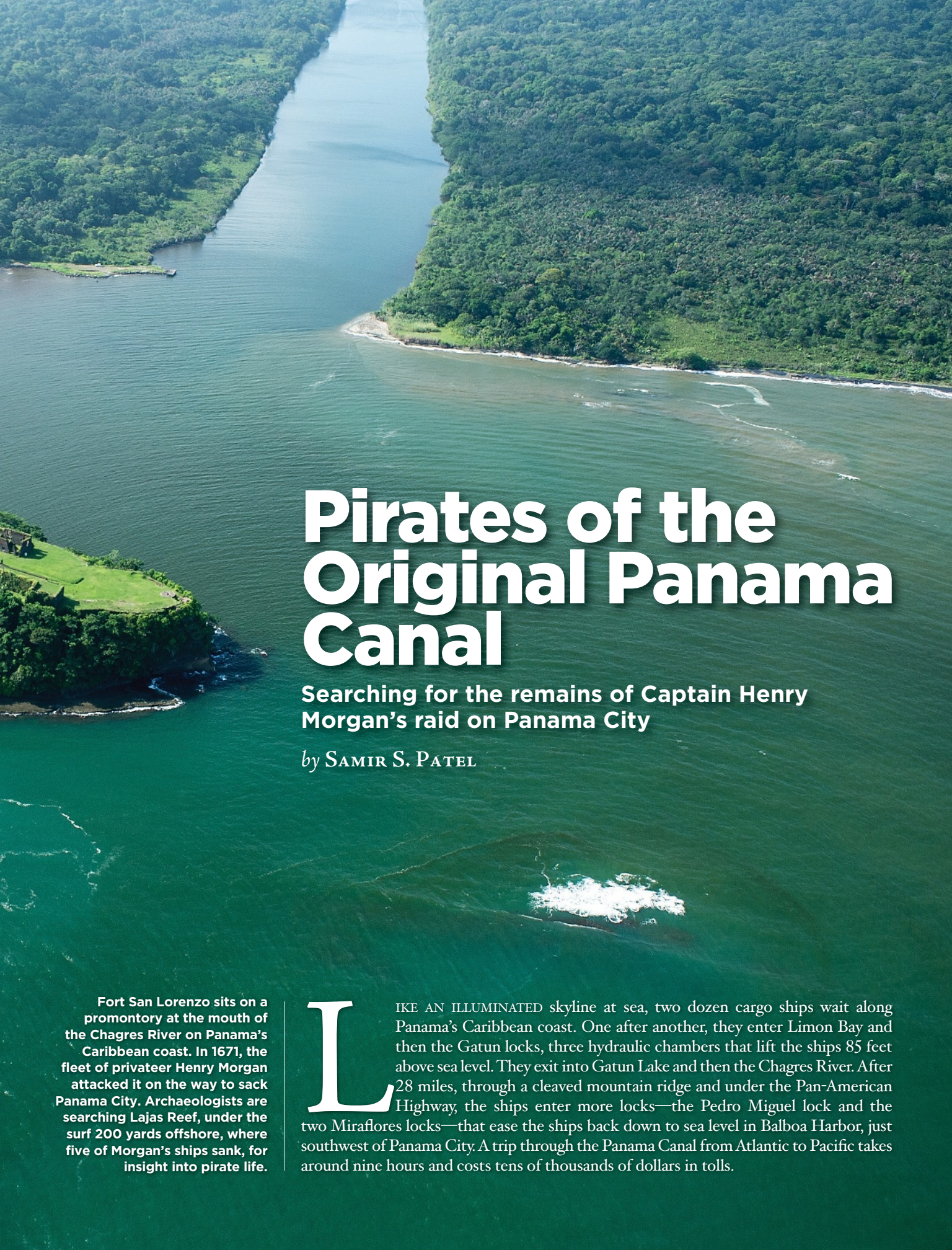
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11







Pirates of the Original Panama Canal

Searching for the remains of Captain Henry Morgan's raid on Panama City

by SAMIR S. PATEL

Fort San Lorenzo sits on a promontory at the mouth of the Chagres River on Panama's Caribbean coast. In 1671, the fleet of privateer Henry Morgan attacked it on the way to sack Panama City. Archaeologists are searching Lajas Reef, under the surf 200 yards offshore, where five of Morgan's ships sank, for insight into pirate life.

LIKE AN ILLUMINATED skyline at sea, two dozen cargo ships wait along Panama's Caribbean coast. One after another, they enter Limon Bay and then the Gatun locks, three hydraulic chambers that lift the ships 85 feet above sea level. They exit into Gatun Lake and then the Chagres River. After 28 miles, through a cleaved mountain ridge and under the Pan-American Highway, the ships enter more locks—the Pedro Miguel lock and the two Miraflores locks—that ease the ships back down to sea level in Balboa Harbor, just southwest of Panama City. A trip through the Panama Canal from Atlantic to Pacific takes around nine hours and costs tens of thousands of dollars in tolls.



Fort San Lorenzo guarded the mouth of the Chagres River—the “original Panama Canal”—for more than 100 years, though it was sacked several times, including by Henry Morgan.

Long before the completion of the canal in 1914, this narrowest stretch of the isthmus separating the oceans was already used to avoid an 8,000-mile detour around Cape Horn. Ships unloaded cargo at the mouth of the Chagres River, seven miles from the modern canal entrance. Flat-bottomed river barges then moved people and cargo upriver to within 13 miles of Panama City, where donkeys took over on the Camino de Cruces trail. “For four centuries the Chagres has been the bond of union between the two great oceans of the world, the way between the East and West,” wrote C.L.G. Anderson, an early-twentieth-century historian. Until the river became part of the canal it inspired—dammed to form Gatun Lake—it was the original, natural “Panama Canal.”

Beginning in the sixteenth century, the Spanish used this route to supply Panama City and move gold and silver from the city to galleons in the Caribbean. In 1671, famed English privateer Captain Henry Morgan took the largest pirate fleet in history up the river to sack the city and rattle Spain’s control of the Americas. And centuries later, during the California Gold Rush, it was easier for prospectors to take a steamer to Panama, sail up the river, then make their way north in the Pacific than it was to travel overland between America’s coasts. For all the precious metals that have traveled up and down it, the Chagres has been called “the world’s most valuable river.”

SINCE THE FIRST trans-isthmus railroad opened in 1855, the mouth of the Chagres River has been a backwater surrounded by a clotted jungle full of anteaters, toucans, and bellowing howler monkeys. On a promontory above, shaped like the prow of a massive ship, sit the ruins of El Castillo de San Lorenzo el Real de Chagre, or Fort San Lorenzo, which defended the important trade route between 1626 and 1741. It was sacked several times, including by Morgan’s men on their way to Panama City in 1671. Fritz Hanselmann, an underwater archaeologist at Texas State University, is looking for evidence of the privateer’s Panamanian raid—but not in the fort. He’s focused on a string of whitecaps in the sea 200 yards from it, treacherous Lajas Reef, which sank five of Morgan’s ships, including his flagship *Satisfaction*.

Hanselmann, stocky, ruddy, and blond as a Viking, sits in the back of a 23-foot fiberglass boat piloted by Bert Ho, a remote-sensing specialist with the U.S. National Park Service (NPS) Submerged Resources Center. It is a rare day of calm seas here, where a pileup of current and wind often makes for serious chop and queasy stomachs.

“Twenty meters,” Hanselmann calls out, “ten ... five ...” Aaron Wallendorf, a research diver from Texas State, leans over the side, anchor and buoy in hand.

“Now,” says Hanselmann, and Wallendorf drops the anchor. Ho guides the boat in a wide circle while the others put on scuba gear. The buoy now marks a magnetic anomaly, a variation in the earth’s magnetic field caused by a submerged metallic object. In a relatively small area around the fort and

river mouth, Ho and Andres Diaz, another specialist with the NPS, detected approximately 150 of these anomalies during magnetometer surveys over the last two field seasons. Now the team needs to check out each one in person to determine if they represent modern trash, something buried too deep to dig out of the sand, the remains of a pirate ship ... or nothing at all.

Hanselmann, Wallendorf, and a visiting reporter drop down the anchor line to the sand 20 feet below. From the anchor, the divers space themselves out radially, staying in visual contact, and swim around the anchor, a technique called a circle search. With their eyes and a handheld metal detector, they quickly



Archaeologist Fritz Hanselmann and his team search for more evidence of Henry Morgan's pirate fleet by examining magnetic anomalies that may indicate the sites of shipwrecks near the mouth of the Chagres River.

learn whether they will need to come back or if the anomaly can be crossed off the list. There's nothing to see but sand, and Hanselmann wants to hit 10 or 15 more sites this afternoon. He gives a thumbs-up—time to head back up to the boat. Finding anything out here in the ocean, even in shallow water, takes skill, intuition, art—and luck.

HANSELMANN'S WORK is part of the Rio Chagres Maritime Landscape Study, which he started in 2008 with James Delgado of the National Oceanic and Atmospheric Administration, then director of the Institute of Nautical Archaeology at Texas A&M University. The non-profit Waitt Institute was going to have a ship in the area to provide support, so Hanselmann and Delgado began a series of survey dives that January. They observed artifacts spanning 500 years, from sixteenth-century Spanish pottery to Gold Rush-era plates to modern military items. "There's just all kinds of artifacts and material culture littering the seafloor and the mouth of the riverbed right by the fort," Hanselmann says.

The waters aren't kind at that time of year, and their dives on Lajas Reef were particularly treacherous. They dropped in on the ocean side of the reef, body-surfed over the top of it, and descended quickly, before the next swell had a chance to toss them around. "You'd just grab onto the nearest rock and hold on," says Hanselmann, who was then at Indiana University. On the second survey dive, the team found some unmistakable items—encrusted with sea life, but still recognizable—in the rubble at the base of the reef. "There's no confusing what it is," says Delgado. "It's not a sewer pipe. It's a gun."

More specifically, they were cannons, eight of them, in a variety of sizes. Nearby were three clusters of magnetic anomalies, suggesting to Hanselmann and Delgado that they had found remains of the only ships documented to have sunk on the reef—Morgan's. There was also clear evidence that artifact collectors had been there before: cut marks, drill holes, even craters from explosives. Because the cannons were at risk from looting or being lost in a storm, Panama's National Institute of Culture (INAC) agreed they should be raised. Hanselmann returned to the site, with Waitt Institute funding, in 2010, to remove the cannons for study before continuing with the rest of the project. "It was largely go in, get the guns, get out," says Hanselmann.

He and his team placed straps around each cannon (ranging from approximately 200 to 900 pounds), partially inflated lift bags, moved the cannons off the reef, and then towed them by boat to a nearby boat launch, where they used a piece of sail-



Using canvas straps and lift bags, archaeologists retrieve cannons thought to have been used by Henry Morgan's fleet.



Cannons lifted from the water near Fort San Lorenzo could be the first archaeological evidence of Henry Morgan's attack on Panama City, which shook the geopolitics of the New World.

sailboat decking to slide them out of the water. Hanselmann calls it their “cost-effective cannon recovery system.” Only six were recovered—the other two, the smallest ones, may have been moved by a storm. INAC did not have the facilities to store or treat the cannons. The Smithsonian Tropical Research Institute then agreed to keep them for almost a year, until a private preservation group based in Panama City, Patronato Panamá Viejo, could outfit their conservation lab to study them. They prepared the cannons for display in a museum next to the ruins of the original Spanish Panama City—the very one sacked by Morgan. If confirmed to be his, the cannons will be the only documented archaeological evidence of the pirate raid.

CAPTAIN HENRY MORGAN was the premier buccaneer of his age, the man who ransomed Portobello, Panama, and the man who used his own flagship as a decoy and feinted a landward attack to sneak out of heavily defended Maracaibo Harbor in Venezuela. “The name Morgan was really legend in the Caribbean,” says Stephan Talty, author of *Empire of Blue Water*, about Morgan’s career. His modern image—drawn largely from rum bottles—depicts a dashing, anarchic gadabout, but Morgan was more strategist than swashbuckler. He was also a patriot, from a good military family, who operated as a privateer, a pirate licensed by the British Crown to steal from other countries’ ships and settlements—especially Spain’s. “Morgan was sort of the point of the spear

with regard to [England’s handling of] the Spanish Main,” says Talty. Perhaps the boldest gambit in a career full of them was his attack on Panama City, one of the richest cities in the Spanish Main. From his base of operations in Port Royal, Jamaica, Morgan assembled a fleet of 36 ships, 1,846 men, and almost 250 cannons. Their plan was to take Fort San Lorenzo, sail up the Chagres River, and traverse the Camino de Cruces to the city—and then loot and pillage it. In January 1671, an advance party of three ships and 470 men arrived at the mouth of the Chagres, anchored nearby, and canoed and hiked in to attack the well-armed fort from the rear. For two days the Spanish soldiers fought hard, but the pirates prevailed. The rest of the fleet soon arrived. Perhaps it was an excess of enthusiasm, perhaps a navigational error, but upon arrival, five of Morgan’s ships, including his flagship, wrecked violently on Lajas Reef, just below the newly taken fort. “While he’s a brilliant military strategist with a serious stroke of luck, Morgan was not perhaps the best navigator,” says Hanselmann. They hit the reef so hard that the ships shattered, and 10 men and the fleet’s only woman (a “bruja,” or witch, Morgan kept on staff) drowned.

Undeterred, the rest of the ships avoided the reef and made it to the river. News of their arrival had reached the city, where Morgan was known as “El Diablo.” Resistance along the way was minimal. “They feared him so much, they sort of melted away,” says Talty. But the fleeing populace took supplies and most of the city’s riches with them. The privateers looted and tortured, but came away with much less plunder than they had hoped. Spanish accounts claim that Morgan’s men then burned the city to the ground, though widespread evidence for this inferno has not been found in Panama Viejo, the ruins of the original Panama City (see “City of Towers,” page 35). Afterward, the city was rebuilt in a more defensible position, but Morgan’s fleet had revealed that Spain—overstretched and debt-ridden—had at that point only a tenuous grip on the New World. “I think Morgan’s attack on Panama really begins to illustrate that rot, that their defenses were just honeycombs,” says Talty. It was, perhaps, the beginning of the end for the Spanish Main.

“Panama was pretty disappointing; it turned out to be much more important



Henry Morgan, depicted here in an 18th-century portrait, was known for his bold gambits. A period lithograph depicts his narrow escape from Spanish warships at Maracaibo Harbor, Venezuela.



City of Towers

MODERN PANAMA CITY has a love affair with height. Soaring condos line the city's waterfront. The source of this modern obsession might be visible in the very oldest part of the city—the restored bell tower at Panama Viejo, the ruins left behind following Captain Henry Morgan's sacking of the city in 1671. One of the few Panamanian archaeologists, Tomás Mendizábal, former director of Panama's National Museum, used to dig at the site with Patronato Panamá Viejo, the preservation group responsible for its upkeep. Panama Viejo is “the only place in Panama you can actually do research and archaeology in a country where such things are unusual,” says Mendizábal.

Just under the Spanish settlement at Panama Viejo is evidence for 1,500 years of pre-Columbian occupation. Among the early finds are several complete urn burials, as well as a burial of a woman who was laid on a bed of skulls and surrounded by nine more skulls. The find predates the Spanish town by 300 years.

The existing structures, some of which have been restored, are meant to represent the Spanish town in its final moments.

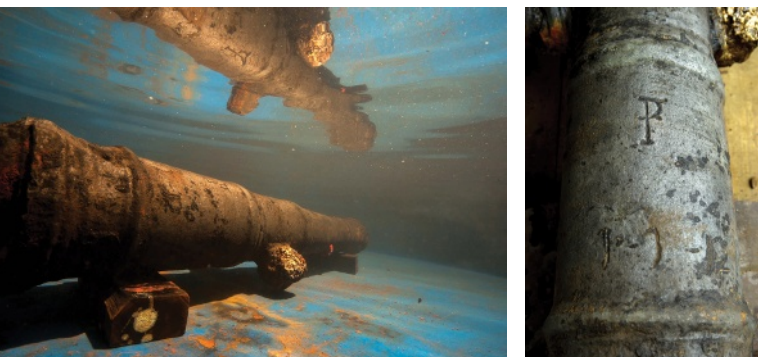
The Spanish wrote that Morgan and his men burned the town on their way out. Accounts speak of a tall column of smoke. But evidence of the city's demise has been hard to come by, says Mendizábal, who is also Panamanian codirector of the Lost Ships of Henry Morgan Project. In the ruins of what would have been city hall, on a staircase landing, is a layer of ash and charred stone steps (and the remains of a sword) that can be dated to the sacking. Across the plaza, there are layers of roofing tiles where ceilings caved in, but they were not burned. There is no other evidence of fire anywhere else. “Not one bit of ash,” says Mendizábal. “There isn't a smoking gun, unless the whole town is a smoking gun.” This apparent lack of evidence for the well-documented burning of the town presents a puzzle, and makes the search for other evidence of Morgan's presence in Panama even more interesting.

Mendizábal also sees the search for the remains of Morgan's raid through a local perspective. It wasn't just a pirate attack, it was also the destruction of a city and the intimidation and torture of a populace. “If people knew what pirates did,” he says, “it wouldn't be quite so romantic.”

geopolitically than it was financially,” says Talty. Two months before the attack, England had signed a treaty with Spain in which England agreed to suppress piracy in the Caribbean. Though Morgan’s sacking came within the treaty’s eight-month grace period, it still proved politically inconvenient. Morgan was arrested and called back to England, but it was likely for show. He was knighted and, in 1676, was sent back to the Caribbean, this time as part of the establishment—lieutenant governor of Jamaica. He died in 1688, happy and drunk, on a 400,000-acre sugar plantation. “Piracy is not all it’s cracked up to be, perhaps,” says Hanselmann, “except for Morgan, it was.”

THERE ARE TWO “Old Panamas” in Panama City: Casco Viejo, the historic district where the town was rebuilt after Morgan’s attack, and Panama Viejo, the ruins of the original. Next to Panama Viejo is the museum of Patronato Panamá Viejo, which includes the conservation lab that is handling the cannons retrieved by Hanselmann and his colleagues. The six cannons rest in water baths in the facility, where researchers hope to learn how they got to be on Lajas Reef.

Ruth Brown, formerly of the Royal Armouries in the Tower



The cannons retrieved from Lajas Reef are being conserved in a laboratory in Panama City. Those freed of concretion display marks that are consistent with the kinds of armaments Henry Morgan’s ships would have carried.

of London, has several decades of experience studying cannons, and was called on to help identify the Lajas Reef finds. The first telling detail is the size of the guns. They are short, of small caliber. The four smallest are likely to have been deck guns. Pirates and privateers either seized their cannons or purchased them on the secondary market, often resulting in a diverse collection of sizes and makes. No two among them are the same.

Two have been treated, using saws and wire brushes, to remove the stony concretion around them. Brown, who examined photographs of the cannons, has looked at their shapes, designs, ring patterns, settings, build quality, and markings. The cannons carry weight marks in English units and a “P” indicating they had been “proofed.” “That means someone’s tried it out and it hasn’t blown up in their face,” says Brown. After the 1690s, makers’ marks were cast on cannon trunnions, but these cannons lack such marks, strongly suggesting they were made earlier. The absence of broad arrows means they were not military cannons, but were used by English merchants or pirates. “Everything is consistent with what

you would expect [for a Morgan ship], but there’s no killer blow either way,” says Brown. She hopes that one of the others might hold a maker’s mark that will help pin the age of the cannons down more securely. The evidence so far, and the fact that no other ships from the period are known to have wrecked on the reef, help make a strong circumstantial case that Hanselmann’s team has indeed found the only known archaeological remains of Morgan’s Panamanian raid.

There are tantalizing hints that more lies buried near the reef. Damage on the reef suggests that much has already been removed. Online auctions have offered items claimed to have come from Lajas Reef, including a hand grenade, a breechblock, and a 17-inch pewter plate marked “Port Royal”—perhaps direct evidence of Morgan’s presence. Also, a report from a treasure hunter in the 1970s stated that there were once more than 140 cannons on the reef, along with 22 anchors, thousands of cannonballs, buckles, muskets, and even an inscribed pocket watch. When the same man returned years later, most of the material was gone. But some may remain, buried under the sand. “We have some really promising clusters of anomalies that are just to the west of the reef,” says Hanselmann. “Given prevailing winds, river current, and ocean current, that would be a good [resting] place for ships that sank after having hit the reef and then being pushed off.”

Hanselmann and his team hope to find remains of the ships themselves, which could tell them about life in a privateer fleet. “We don’t know much about what it really, truly was like to be a pirate or a privateer,” says Hanselmann. Pirate society was known for a certain kind of egalitarianism. If significant portions of ships are found, spatial analysis of their layouts or modifications might reveal some of these social dynamics, such as whether Morgan had his own cabin or shared quarters with his men, as some pirate captains had. The design of the ship itself could reflect its culture.

After announcing the retrieval of the cannons in a press conference in 2010, Hanselmann’s team was approached by representatives of the Captain Morgan Rum Brand. Sensing an opportunity for marketing and media, they asked how they could help. “Well, write us a check,” Hanselmann told them. So they did—supporting the last two field seasons. The 2011 expedition was the team’s first full field season of magnetometer surveys and circle searches, followed by another in 2012. They have already found one shipwreck, perhaps a Spanish merchant vessel (see “Horseshoe Wreck,” page 37), that is helping provide some of the socioeconomic context into which Morgan’s fleet sailed in 1671.

It is thought—with good reason—that there are many more wrecks to be found among the magnetic anomalies beyond Lajas Reef. Twenty ships are known to have gone down in the immediate area, with more than 12 from the Gold Rush period alone, including *Lafayette*, a steamer that burned with Gold Rush passengers aboard in 1851. There are possibly many more. The search for Morgan’s ships is just one piece of what will be a cluster of projects looking at different wrecks, different time periods, and related sites on land, including the fort and the now-vanished Gold Rush boomtown known as Yankee Chagres. “Through this overarching study, people can now pick

certain aspects and begin to work on them,” says Delgado. “It’s a tremendous laboratory for ongoing archaeological work.

“It doesn’t take long to realize what an important role Panama played, not just in U.S. history, but in world history, as one of the major links in maritime trade that united the world, from pre-Columbian days to the Spanish Empire to the cre-

ation of the isthmus as a transit point during the Gold Rush,” he adds. “Whatever happens here is a lifetime of work, not just for one archaeologist, but for a group of archaeologists.”

“We’ve just barely started,” says Hanselmann. ■

Samir S. Patel is deputy editor at *ARCHAEOLOGY*.

Lead cargo seals indicate that this wreck—called the “Horseshoe Wreck”—was probably a 17th-century Spanish merchant ship. The finds might provide insights into the strained Spanish economy in the New World.



Horseshoe Wreck

IN 2010, A TEAM LED by Fritz Hanselmann of Texas State University retrieved six cannons that may have belonged to notorious privateer Captain Henry Morgan from Lajas Reef in Panama. A year later, Hanselmann returned to the Caribbean mouth of the Panama Canal with a crack team of maritime archaeologists to look for more. Investigating one of the anomalies recorded during magnetometer surveys, the team saw what appeared to be a rocky coral outcrop. Further investigation showed it to be encrusted wood. Within an hour, Hanselmann and his team had found a wooden chest with a latch on it.

At the beginning of the 2012 season, Hanselmann and his team returned to the site for more investigation and documentation. The wreck is nestled in the soft sandy seafloor under 25 feet of water. Using a makeshift water cannon, Hanselmann cleared the accumulated sand from the wreck, revealing a strange grid: a floor of wooden boxes, packed tightly, in perfect rows. The tops of a few of the boxes are gone and their contents visible, including concreted masses of horseshoes (providing the wreck with its name, the “Horseshoe Wreck,” though they’re more likely to have been used on donkeys), in addition to nails, and other supplies. Some of the wood carries

a herringbone pattern, perhaps from nets used to secure it on the ship. The team has documented more than 75 chests and portions of the wooden hull. Lead cargo seals indicate it was most likely a Spanish merchant ship. One candidate is *Chaperone*, a ship from the Tierra Firme Armada known to have foundered in heavy seas in 1681 at the mouth of the Chagres, or it may be a barge that sank while removing *Chaperone*’s cargo was being removed. In providing a picture of Spanish commerce at a time when their New World empire was faltering, the wreck offers more information about the struggling economy of the Spanish Main when Morgan arrived.

For example, one of the seals has a fleur-de-lis on it, suggesting French origin. At the time, the Spanish had clamped down on trade with external parties. But people in the overstretched empire may have had to trade wherever and with whomever they could. The seal hints at an “undocumented, unspoken black market occurring across nationalities,” says Hanselmann. Perhaps this economic strain is one reason that Morgan met with so little resistance in his march to Panama City.

“They’re all intertwined and they’re all interconnected,” says Hanselmann of the Horseshoe Wreck and the other wrecks—Morgan’s—he still hopes to find.

Archaeology Island

More than 4,000 years of history in only 16 square miles

by ANDREW LAWLER

A FORGOTTEN sliver of land in the far north of the Persian Gulf, Kuwait's

Failaka Island is home now mostly to camels. Its only town is a sprawling ruin pockmarked with bullet holes and debris from tank rounds, and the landscape beyond seems empty and bleak. Even before Iraq's 1990 invasion of Kuwait prompted its sudden evacuation, Failaka in the past century was little more than a quiet refuge for fishermen and the occasional Kuwaiti seeking relief from the mainland's fierce heat. But just under the island's sandy soil, archaeologists are discovering a complex history extending back 4,000 years, from the golden age of the first civilizations to the wars of the modern era.

The secret to Failaka's rich past is its location, just 60 miles south of the spot where the Tigris and Euphrates Rivers empty into the Gulf. From the rise of Ur, the world's largest metropolis in the late third millennium B.C., until Saddam Hussein's attack during the First Gulf War, the island has been a strategic prize. For thousands of years, Failaka was a key base from which to cultivate and protect—or prey on—the lucrative trade that passed up and down the Persian Gulf. In addition, there were two protected harbors, potable water, and even some fertile soil. The island's relative isolation provided a safe place for Christian mystics and farmers amid the rise of Islam in the seventh and eighth centuries A.D., as well as for pirates a millennium later.

Currently, archaeological teams from no less than half a dozen countries, including Poland, France, Denmark, and Italy, are at work on Failaka. Given the political volatility of neighboring nations such as Iraq, Iran, and Syria, the island offers a



An aerial view of Kuwait's Failaka Island shows four different sites representing thousands of years of civilization.

welcome haven for researchers unable to conduct their work in many other parts of the region. "I started encouraging teams to come in 2004," says Shehab Shehab, Kuwait's antiquities director. "And I want to encourage more."

The mainland of Kuwait is mostly harsh desert, with only a handful of significant ancient sites. Even the old town of Kuwait City, dating back two centuries, was long ago demolished to make way for skyscrapers. Thus Failaka is of prime importance to the country's heritage. Recently,

much of the island's history was threatened by a plan to transform the barren land with its rocky coast into a major tourist magnet, complete with marinas, canals, spas, chalets, and enormous high-rise hotels and condominiums. In the wake of the global economic recession, however, the \$5 billion project foundered, and was recently shelved. Shehab has moved into the resulting vacuum, lobbying hard to turn all of Failaka into a protected site in order to enable archaeologists to uncover, study, and preserve this small nation's past.

The government already sets aside more than \$10 million annually to cover the costs of foreign projects in Kuwait, and hopes to promote science as well as encourage heritage tourism. "Shehab's dream is to create in Kuwait a kind of research center for Gulf basin archaeology," says archaeologist Piotr Bielinski from the University of Warsaw, who is digging at a prehistoric site on the mainland just north of Kuwait City. And excavators on Failaka are making the most of this unique opportunity, exposing evidence of Mesopotamian merchants, religious structures representing three cultures and spanning more than 2,500 years, a pirate's lair, and the remains of Failaka's last battle, ample testimony to the island's millennia-long endurance.



TRADERS FROM UR?

TEAM MOESGÅRD MUSEUM, DENMARK

ERA CA. 2000 B.C.

CULTURE MESOPOTAMIAN



The oldest settlement on Failaka was long thought to have been founded in about 1800 B.C. by the Dilmunites, a maritime people who likely hailed from what are today's Bahraini and Saudi Arabian coasts, and who controlled Persian Gulf trade. But on Failaka's southwest corner, a team from Denmark's Moesgård Museum has uncovered evidence that Mesopotamians arrived at least a century before the Dilmunites. The finds are centered on a recently unearthed Mesopotamian-style building typical of those found on the nearby Iraqi mainland dating from around 2000 B.C. The structure was later partially covered by a Dilmunite temple.

There the Danish team excavated an ostrich egg, a shell ladle

of Indian manufacture, and pottery similar to that found in what is today Pakistan. These discoveries attest to a vibrant mercantile business run by Mesopotamians themselves, rather than Dilmunite middlemen. The most telling artifacts were four cylinder seals of the type used by scribes to identify Mesopotamian traders and their goods during the end of the third millennium B.C. These seals, found within the building, demonstrate the port's importance during this first era of global trade. "This is not just a fishing village," says team director Flemming Hojlund. Instead, the team's work suggests that Mesopotamians, far from being passive consumers of foreign goods brought by distant seafarers, were active participants in the sea trade.



ECONOMIC MIGHT

TEAM MOESGÅRD MUSEUM, DENMARK
ERA 1800 B.C.
CULTURE DILMUNITE

In the mythology of ancient Sumeria (modern Iraq), Dilmun is described as an Eden-like place of milk and honey. But by 2000 B.C., Dilmunites were leaving their homeland to become seagoing merchants and establish a powerful trading network that eventually stretched from India to Syria. Mesopotamian clay tablets refer to ships from Dilmun bringing wood, copper, and other goods from distant lands. By the nineteenth century B.C., Failaka had become a linchpin in the Dilmunites' operations. At this point, after the Dilmunites had either ousted the Mesopotamians or merely succeeded them, there are no further signs of a Mesopotamian presence. The Dilmunites constructed a large temple and palace complex almost on top of the houses built by the earlier Mesopotamian residents. A French team that excavated the temple in the 1980s suggested that it was an oddity, possibly related to Syrian temple towers. But recent work by a team from the Moesgård Museum in Denmark points to a building remarkably similar to the Barbar sanctuary in Bahrain, considered the grandest Dilmun structure.

The Failaka temple sat on a large platform nearly 90 feet wide and 120 feet long and the temple itself once measured 60 feet square, only slightly smaller than the Barbar temple. The most impressive remains of the Failaka structure are the shattered, mammoth limestone columns that once supported the temple. Such stone is not found on the island. Dilmunites quarried the massive blocks on the mainland, then ferried them to the island, an impressive feat requiring not only extensive planning and coordination efforts, but also large, seaworthy craft. The columns were also highly valued in later eras, and much of their stone was plundered and taken back to the mainland in antiquity. The Moesgård team is now focusing on the so-called palace, originally excavated in the 1960s, that lies about 30 feet from the temple. Work is still under way, but there are signs that it may have served not as a royal residence but rather as an important series of large storerooms to house the goods that made the Dilmunites a formidable economic power.

Failaka's name is derived from the Greek word for outpost. But Alexander the Great, according to later classical authors such as Strabo and Arrian, gave Failaka the name Ikaros, since it resembled the Aegean island of that name in size and shape. French archaeologists working on the island in recent years have found several stone inscriptions dating to the fourth and third centuries B.C. mentioning the name Ikaros, as well as architecture and artifacts that reveal a bustling community with international ties during that period. The island's accessible fresh water, easily defended coastline, and strategic location also attracted the attention of Alexander's successors, who vied among themselves for control of regional trade routes. Antiochus I, who ruled the Seleucid Empire in the third century B.C., built a 60-foot-square fort around a well on Failaka. Inside the fortress compound, one small, elegant temple has Ionic columns and a plan that is quintessentially Greek,

IKAROS OF THE GULF

TEAM FRENCH INSTITUTE OF THE NEAR EAST, SYRIA
ERA 3RD CENTURY B.C.
CULTURE SELEUCID



including an east-facing altar. This was no simple import, however, but a fascinating amalgamation of designs. The column bases, for example, are of the Persian Achaemenid style, similar to those in the capital, Persepolis, burned by Alexander's troops in the fourth century B.C.

According to Mathilde Gelin from the French Institute of the Near East in Damascus, who is currently working at the site, this unusual pairing reflects a rare fusion of Greek and Eastern cultures—much like Antiochus himself, who was the son of a Macedonian general and a Bactrian princess, likely from today's Afghanistan. The sturdy fort eventually grew into a bustling port town, with other temples, houses, and larger fortifications, until its eventual abandonment by the first century B.C. Gelin hopes the current excavations will reveal what role the fort and settlement played in both island life and that of the wider region during a time of remarkable cultural mixing.



HIDDEN CHRISTIAN COMMUNITY

TEAM CARDINAL STEFAN WYSZYNSKI UNIVERSITY, POLAND
ERA 8TH AND 9TH CENTURIES A.D.
CULTURE CHRISTIAN

The center of Failaka is a low-lying swampy area that is now the province of mosquitoes and wandering white camels that belong to the Kuwaiti emir. But a millennium ago, this was a three-square-mile pocket of fertile and well-watered plain cultivated by a small community of isolated Christians in a region populated by Muslims. Previous French excavations revealed several villages and two churches, including a possible monastic chapel. A Polish team led by Warsaw-based archaeologist Magdalena Zurek is now busy excavating nearby sites to understand the extent of the settlements that flourished in the eighth and ninth centuries A.D., several hundred years after the faith inspired by Muhammad swept through the region. "We know nothing about Christians on Failaka," says Zurek, who suspects that a third



church lies near her current excavation of a modest farmstead. Although an old island tradition is that a community grew up around a Christian mystic and hermit, Zurek

believes that Christians may have settled in the island's interior in order to keep a low profile long after others in the region had converted to Islam. The small farms and villages, which were eventually abandoned, may mark the last refuge of Christianity in the region. Yet the larger of the two churches appears to have boasted a lofty bell tower that would have been visible far out to sea, hardly the sign of a community fearful of announcing its faith. There are few written documents of Christian life around the Persian Gulf in late antiquity and the early medieval period, and Zurek hopes that the work at Failaka, together with other excavations of ancient Christian settlements along the Gulf coast, may reveal their hidden history.

The story of Failaka after the abandonment of the Christian villages remains shadowy. Currently archaeologists are turning their attention to several sites that sit along the northern shore of the island to probe the medieval and early modern periods. The most interesting is located on a high spot overlooking the Gulf, facing Iraq. Nearly 30 years ago, a team from the University of Venice surveyed the site, pinpointing a village, called Al-Quraniya, that dates to at least as early as the seventeenth century A.D., and possibly several centuries earlier. In 2010, an Italian team led by Gian Luca Grassigli of the University of Perugia began intensive field-work there. The excavators have since uncovered an array of pottery, porcelain, glass bangles, and bronze objects, including nails and coins, dating to between the seventeenth and nineteenth centuries A.D. The mound seems to have two large concentrations of building materials, and the archaeologists

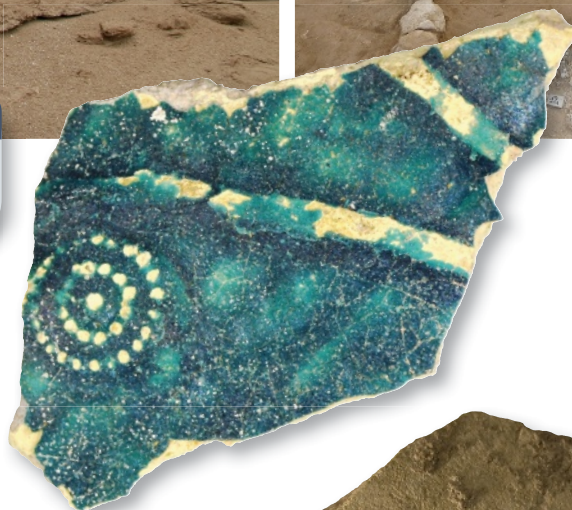
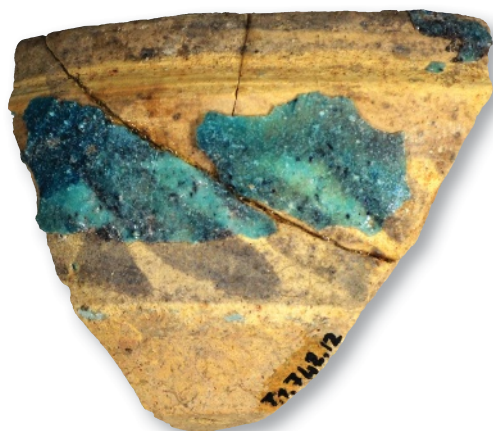
hope to make a detailed plan of the settlement in future campaigns. Deeper trenches may reveal evidence of earlier settlement, filling in the long gap between the abandonment of Christian villages and more recent times.

What is clear is that Failaka was still a notable outpost two millennia after Alexander. Just to the southeast of the village is a small square rock fort dating to about the sixteenth or seventeenth century. Some researchers believe that this structure was constructed by Portuguese soldier-merchants who did frequent business in the region. Others suspect that Arab pirates built the base to attack the lucrative shipping lanes that led to wealthy Iraqi cities such as Basra or to ports along the Iranian coast to the east. In this era, European, Iranian, and Chinese elites had a growing appetite for the Gulf pearls that dominated the region's economy. Pirates were a constant threat until the nineteenth century; British guns and diplomacy put an end to their raids.



PIRATE HIDEOUT

TEAM UNIVERSITY OF PERUGIA, ITALY
ERA 17TH TO 19TH CENTURIES A.D.
CULTURE ARAB/ISLAMIC





THE BATTLE OF FAILAKA

TEAM AWAITING FUTURE STUDY

ERA 20TH AND 21ST CENTURIES

CULTURE MODERN

By the twentieth century, the advent of air travel and the discovery of oil on the Kuwaiti mainland put Failaka on the margins of the Persian Gulf's rush toward modernization. For most of the last 100 years, the island was home to a handful of fishermen and villagers, and the only new inhabitants were those Kuwaitis who built beach homes to escape the mainland's blistering summer heat. In 1990, there were a modest 2,000 full-time residents. But on August 2 of that year, Failaka's location once again came into play when Iraqi forces attacked the island as part of their invasion of Kuwait. The island's defenses consisted only of a small contingent of troops, which the Iraqis quickly overwhelmed, and the population was expelled. American forces retook the island in 1991, in turn expelling the 1,400 Iraqi soldiers who had made it their base. After the Iraqis were driven back across the border into Iraq, the Kuwaiti military used what remained of Failaka's modern town for target practice. Today, the houses are riddled with shell holes. And just outside the settlement, protect-

ed by a high fence, is the latest evidence that the advantages of Failaka's strategic position didn't end in ancient times. Rusted and battered tanks, armored vehicles, and other army equipment damaged and destroyed during the First Gulf War



litter the ground. As clearly as the Mesopotamian seals and Greek temples, these burnt and twisted metal shells speak to the island's continuing role in Middle Eastern history. ■

Andrew Lawler is a contributing editor at **ARCHAEOLOGY**.



Archaeologists have pulled more than 400 elaborately decorated Roman-era objects from the depths of a bog in northern Poland. All of the artifacts are of a military nature, including fragments of belt buckles (above and far right), perhaps belonging to a military leader; a stamped gold mount (right) that decorated a sword scabbard, now missing a gem once placed at its center; a mount (below) from a horse's trappings; and a palm-sized silver vulture figurine (bottom) that may have been mounted atop a staff and used as a standard in battle.





A Stunning Sacrifice

Why were hundreds of valuable objects thrown into a Polish bog more than 1,500 years ago?

by **ANDREW CURRY**

THREE YEARS AGO metal-detector hobbyists near the small village of Czeszkowo in northern Poland turned in a handful of corroded spearheads and fragments of an elaborate belt to a local museum. They then gave the museum staff directions to the swampy cow pasture where they had uncovered them. A year later, archaeologists Aleksandra Rzeszotarska-Nowakiewicz of the Polish Academy of Sciences, Institute of Archaeology and Ethnology, and Tomasz Nowakiewicz of the University of Warsaw, Institute of Archaeology, spent 10 days on the site in the hopes of uncovering more artifacts. Soon they began pulling hundreds of broken iron swords, spearheads, knives, and gold and silver accessories from the ground.

At first, the archaeologists wondered whether the site had once been a cemetery or a settlement. But as the excavations continued in the summer of 2011, key pieces of evidence such as burials or

household goods were conspicuously absent. Rather, the artifacts they extracted from the mud, which now number more than 400, are purely military in nature. And they may be evidence for an ancient practice that has a long history in other parts of Europe, but had never before been discovered in this area.

Much about the site, from the identity of the people who left the artifacts there to its precise date, remains uncertain. Radiocarbon dating of wood fragments and analysis of the weaponry suggest that the site is about 1,700 years old. The people who lived in this region left no written records. Thus, the relatively little we know about them comes from the artifacts they left behind and fleeting references in Roman histories. Although Czeszkowo lies hundreds of miles beyond what would have been the Roman Empire's border at that time, which ran along the Rhine and Danube rivers and through what is now southern Germany, most of the artifacts were probably made within its borders, raising the



A belt appliqué (above), made of gold and silver covered with mythological creatures of a type often depicted in the Mediterranean, was carefully cleaned and restored.



The bog finds also included practical military equipment, including chain mail, swords, and spears. The spearheads, which were made locally, were especially useful in estimating when the arms were manufactured, as their styles changed over the course of the empire's history.

questions of how and why these precious objects ended up so far north at the bottom of a bog. Many different answers are possible, reflecting the complexity of warfare, trade, and diplomacy in the Roman world.

BEGINNING AROUND 350 B.C., and for more than 1,000 years, bogs and shallow lakes in Denmark, Sweden, and northern Germany were used for ceremonies consigning military equipment to the depths. Scholars believe these locations were seen as portals where valuables could be sacrificed to the gods, possibly as prayers in hope of or thanks for a victory. Swords and other weapons were usually bent, broken, or burned before being thrown into the water. And it wasn't only metal that was sacrificed; at some Scandinavian bogs, horses and dogs were thrown in the water as well. "Bogs were the entrance to the underworld," says Rzeszotarska-Nowakiewicz. "Precious things were 'killed' and put into the bog for the gods, to make them happy or to apologize."

In the most famous Danish bog, known as Illerup, more than 15,000 weapons were deposited between A.D. 200 and 500. Examination of the belt fragments and other ornaments from Czażkowo (pronounced chash-KO-vo) suggests they were deliberately defaced. Some of the surviving weapons are partially melted. A sword blade, knife, and spearhead fused together by a single coat of rust may be evidence that personal weapons were tied up and sacrificed together. "I think it's quite clear this bog find is a weapon offering, just like we have in southern Scandinavia," says Ulla Lund Hansen, an archaeologist at the University of Copenhagen. "But the location is really unusual. It's amazing it is where it is."

For millennia, the site had been part of a shallow lake. In the nineteenth century, drainage ditches turned it into a wet meadow cut in half by a slow-moving creek, now the property of a local farmer. "During the excavation's first few days there were cows in the trench, and we had to invent a system of pumps to keep the water low enough to dig," says Nowakiewicz. Steady rains didn't make excavation any easier. By temporarily damming the creek and pumping out water every day, the team was able to dig down into the ancient lakebed, cutting through layers of sand, silt, and peat. After weeks of digging in a 1,000-square-foot area, they had recovered several hundred items.

Most of the artifacts wouldn't look like much to the average person. After centuries in the water, the majority of the iron pieces are more rust than artifact. But in the conservation lab, the contours of the original objects soon emerged. Among the hundreds of corroded iron pieces, most of which are fragments of swords, are also several dozen stunning objects made of precious metals: a hammered-gold sword hilt, a palm-sized silver vulture figurine, and belt appliques and buckles inlaid with images of fantastical half-man, half-animal figures. Though the leather they were mounted on has long since rotted away, Rzeszotarska-Nowakiewicz believes these once decorated a warrior's sword belt and scabbard. The team also found a cor-

roded piece of finely crafted Roman-style chainmail with rings just a quarter-inch across, some of them gilded.

At a conference in summer 2012 near Czeszkowo, which is in the Piecki Commune and Mragowo District, experts debated where the artifacts might have originated. Some scholars thought the half-man, half-animal designs resemble motifs found in the art of Byzantium, which became the capital of the eastern Roman Empire in A.D. 330. Others saw similarities to artistic styles from as far away as ancient Persia. And there are parallels to designs on some of the weapons pulled from bogs in Scandinavia. "They're well done, well produced, certainly not something made locally," says Nowakiewicz. "Their quality indicates they originated in the Mediterranean," although exactly where remains unknown.

Dating the artifacts has also proved challenging. Especially when objects are intrinsically valuable, or made of precious

pressed or no longer practiced. In northern Germany and Scandinavia, bog sacrifices seem to flourish at times when the lands outside the Roman frontier were at their most chaotic. We know from Roman accounts that in the third century A.D., as the challenges to Roman supremacy became greater, the fights along the empire's borders intensified. Beginning around A.D. 300, waves of migrating Germanic tribes including the Goths, Saxons, and Lombards crashed through central Europe from the north, battling for territory and putting such pressure on the Roman Empire's borders that they eventually began to collapse in the fourth century. But the battles that must have gone on far beyond the borders, where tribal chieftains contested for supremacy, sometimes using arms and equipment provided by the Romans, went unrecorded in the histories. Archaeological sites such as Czeszkowo are now beginning to fill in this gap.



materials, dating can be very complex. Jewelry and weapons are often passed down for generations. Thus, even when it is possible to determine the date when certain artifacts were buried, they may actually be much older. And the confusion can cut both ways. Even if archaeologists can tell when an object was made, it might have been a treasured heirloom that was only deposited in the muddy bog centuries later. Rzeszotarska-Nowakiewicz and Nowakiewicz have compared the Czeszkowo artifacts to similar finds from sites ranging from western Europe to the Caucasus and as far as the Middle East and settled on a date of between A.D. 250 and 450. But they are still unsure when exactly the artifacts were thrown into the bog, or even whether they were all left at once, rather than as part of multiple sacrifices over a long period of time. "Very often, there wasn't only one ritual offering. People return over and over to these special places," says Lund Hansen.

Experts believe these bog sacrifices continued into the early medieval period, when Christianity took hold across Europe and many ancient pagan rituals were either sup-

An improvised system of pumps helped archaeologists drain the site enough to excavate it, although they still had to contend with bad weather, mud, and cows.

FOR ARCHAEOLOGISTS, one of the ways to document how far Roman influence reached is by tracking the Roman-made objects found outside the empire's borders. Roman coins and goods such as glass and metalwork have been found as far from Rome as modern Russia and Sweden, and graves in Germany, Poland, and elsewhere in Central Europe are rich with items that originated in the empire's workshops.

There is historical and archaeological evidence for contact between the Roman Empire and the region around the Baltic Sea beginning as early as A.D. 54. In some cases, the Romans used high-value items to buy themselves a sort of buffer zone of loyal tribes along the frontier. There were also more conventional exchanges—for furs, slaves, and other exotic goods. The Romans were particularly obsessed with amber, the fossilized



An image of a lion (left), an animal unknown so far north, adorns a silver plaque. A solid gold mount that once decorated a sword hilt (below) is covered with images of dolphins. These animals would have been far more familiar to craftsmen from the Mediterranean than those from the Baltic, and indicate that these objects were likely not manufactured where they were found.



sap of ancient trees, which they used to make jewelry, toiletries, knives, mirror handles, and boxes for cosmetics. One of the few places raw amber is found is the Baltic, where waves wash the green- and honey-colored material onto the shore.


Although amber was, in fact, popular long before the Romans acquired a taste for it, the historian Tacitus describes how along the Baltic coast “for a long time it [amber] lay unheeded like any other refuse of the sea, until Roman luxury made its reputation.” Beginning a few centuries before A.D. 1, amber made its way south from the Baltic, through modern Poland, and down through Hungary to northern Italy, over a loosely organized trade route scholars today call the “Amber Road.” Archaeologists have found Baltic amber in burials and hoards all along the route, evidence for far-reaching trade networks. “Rome had relationships with northern and central European tribes to keep the routes open for amber,” Rzeszotarska-Nowakiewicz says.

Amber eventually became so coveted that emperors searched for ways to cut out a continent’s worth of middlemen. Writing in the first century A.D., the Roman historian Pliny the Elder describes a mission dispatched in A.D. 60 by the emperor Nero to bring amber back to Rome. “We don’t know if they reached the Baltic coast, but we can be sure they were aware of the area,” says Heino Neumayer, an archaeologist at Berlin’s Museum of Pre- and Early History. In exchange for amber, Roman luxury goods, including weapons and fine metalwork, flowed north, turning up millennia later in excavations of cemeteries across the Baltic region, including sites not far from Czeszkowo.

High-value objects may also have been given as diplomatic gifts to loyal allies on the edge of the empire, then traded locally or captured in battles between tribes. Finally, German tribesmen served in the Roman army, and may have taken their equipment home with them when they left service or retired. There is also the possibility that the objects were war booty, seized as loot from raids into Roman territory and passed north. “Clearly the finds at Czeszkowo show connections and contacts with Rome,” Rzeszotarska-Nowakiewicz says. “But was it war or conflict, or trade? We don’t know.”

A FEW WEEKS AFTER the conference, Rzeszotarska-Nowakiewicz and Nowakiewicz were back at Czeszkowo. In the still-waterlogged soil they found a large wooden construction, perhaps part of a platform that extended into the water like a pier or dock. Three additional weeks of excavation also yielded more iron artifacts and a few fragments of silver. With only a small area of the Roman-era lakebed—about the size of a quarter of a basketball court—explored so far, it’s difficult to say what else is out there. Did the team just get lucky and stumble on the evidence of a solitary weapon sacrifice, the result of a single long-ago victory? Or is the thick grass of Czeszkowo’s meadow concealing something much larger? “Every time we start digging, we come across something quite new and unexpected,” Rzeszotarska-Nowakiewicz says. ■

Andrew Curry is a contributing editor at *ARCHAEOLOGY*.



Tens of thousands of men were wounded or died at the Battle of Waterloo, but, remarkably, the remains of this lone soldier are the only ones to have been found near one of the battle's main staging grounds. The musket ball that likely killed him is visible in his right rib cage.

A Soldier's Story

The battle that changed
European history, told through the
lens of a young man's remains

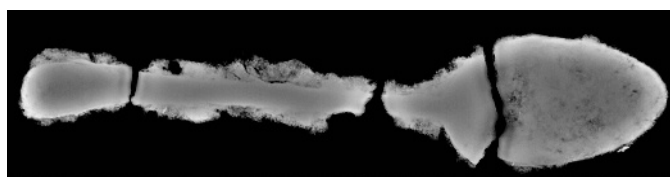
by JARRETT A. LOBELL

THE BATTLE BEGAN mid-morning, Sunday, June 18, 1815. Throughout the day, more than 200,000 soldiers met on a piece of land only 2.5 miles square near the small Belgian town of Waterloo. Blinded by smoke from gunpowder, deafened by cannon blasts, and in constant fear of long-distance gunfire, close-range saber fights, or being trampled in a cavalry charge, the soldiers fought on. By evening, the battleground was completely covered with the wounded, dead, and dying. The Allied forces, led by the Duke of Wellington and the Prussian General von Blücher, had defeated Napoleon's Grande Armée by the slimmest of margins, signaling the end of the emperor's reign in France and ushering in a period of prosperity and peace in Europe that would last for nearly half a century. But a battle's stories are not only those of dethroned monarchs, victorious generals, or territory gained or lost. Sometimes the remains of the men who died on that day tell the richest tales.

BEHIND THE BRITISH LINES, away from the battlefield, a single soldier lay mortally wounded by a musket ball. Perhaps he dragged himself behind the front line, dropped to the ground to rest, and died not long after.

Or maybe he expired before he could be transported to the infirmary, less than 1,000 feet away. He likely died in the early to middle part of the day and was quickly buried by his comrades or by an explosion that churned up the earth and covered his body. Had he died at the end of or after the battle, his corpse would have been recovered by soldiers collecting their dead. But this soldier would have to wait a while longer for someone to tell his story.

Almost two centuries after the soldier's death, the role of storyteller fell to archaeologist Dominique Bosquet of the Université libre de Bruxelles. He found the soldier while excavating before construction near the battle monument known as the Lion's Mound. For Bosquet, the discovery was a complete surprise. "I think this is a unique case," he says. "We excavated 120 trenches in this area, covering more than half an acre, and found almost nothing and no other remains." In fact, the soldier is not just the only one to have been found in this area—he is the first and only British soldier to have fought and died at Waterloo ever discovered on the site. (Another soldier was supposedly found in the early twentieth century; however, later DNA analysis showed that the remains came from two different people and that that "soldier" was a forgery.) Although the soldier's head and one of his knees were



The objects the soldier had with him when he died began to tell his story. Where the soldier's right hip pocket would have been, archaeologists found a spoon (left top) that they X-rayed (left middle) hoping it would bear an insignia that would reveal the soldier's regiment. A piece of wood with the initials "C.B." (left bottom) may be part of the soldier's weapon.

destroyed by a bulldozer, and some of the bones of his hands and feet were damaged either by a plow—the area has long been a wheat field—or perhaps by a battlefield explosion that tore them away, the skeleton is remarkably intact. Bosquet is able to say that he was between 20 and 29 years old, about five feet three inches tall, with a slender frame.

But, in some ways, the artifacts the archaeologist has recovered are able to tell even more of the soldier's story than his remains can. At his hip, where his pocket would have been, Bosquet uncovered a spoon, a belt buckle, and 22 coins, as well as small pieces of fabric that probably belonged to the soldier's uniform. Hoping it would have a mark that would enable him to identify the soldier's regiment, Bosquet took X-rays of the spoon but, disappointingly, no such marks were visible. Bosquet holds out hope that the buckle, which is currently being conserved, may have some identifying marks. It was found near the soldier's right leg and Bosquet suggests it could be from a belt used as a tourniquet to stop the bleeding from a battlefield wound, possibly the one that damaged his feet and hands. And among the coins, most of which are still awaiting cleaning

and identification, there is a French half franc dating to 1811. "Perhaps in Belgium, English soldiers paid in French money in cabarets," says Bosquet. "Or he may have stolen it from a dead French soldier's pocket."

The archaeologist was able to identify the soldier as British not only by his position behind the British lines—in the chaos of the battlefield soldiers could easily find themselves on the wrong side—but by the musket ball still lodged in his rib cage. "According to its weight and diameter, the bullet is definitely French," says Bosquet. Two flints the soldier carried in his pocket also mark him as a member of Wellington's forces, as they are dark gray and of dimensions corresponding to the Brown Bess musket, the typical weapon of British troops.

By contrast, the flints used to fire the French muskets were light yellow.

SOMETIMES A SOLDIER'S STORY ends with his death on the battlefield. But for Bosquet, there are still parts of this narrative that he hopes to finish. First and foremost he would like to know the soldier's name. Next to the body the archaeologist found a piece of wood with the initials "C.B." It is possible that

the wood was part of the soldier's gun, but Bosquet isn't certain, and admits the initials could be those of another man to whom the object originally belonged. With the regimental insignia that Bosquet hoped to get from the spoon, or that may still come from the buckle, it may be possible to search

for a "C.B." among the British rolls. Without these pieces of evidence, giving the soldier a name is unlikely. But the absence of a name doesn't make the story any less affecting. "After we uncovered him, I could almost see the guy dying before my eyes," says Bosquet. "It was very touching and evocative of the cruelty of battle. For me, this was very hard." Bosquet plans to contact the British embassy and army to ask whether they wish to give the remains a proper burial at Waterloo or have them returned to Britain for interment there. The archaeologist also wants to include the discovery in a new memorial at the site, ensuring that the soldier's story, once told, will never be forgotten. ■

Jarrett A. Lobell is executive editor at *ARCHAEOLOGY*.



Archaeologists also uncovered 22 coins (above) minted in different countries. These, along with a small piece of red fabric and a musket flint (inset, top) helped identify him as a British soldier. A belt buckle found next to the soldier (right) may hold further clues to his identity. It is still being conserved.

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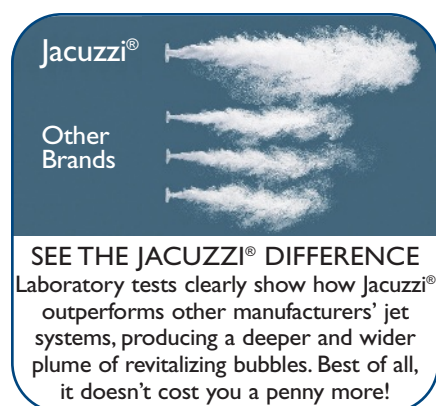
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Because of a long-running border dispute with Thailand, Cambodian soldiers guard the ruins of the Preah Vihear temple complex, which was declared a UNESCO World Heritage site in 2008.

The Battle Over Preah Vihear

A territorial dispute involving a 1,100-year-old Khmer temple on the Thai-Cambodian border turns violent

by **BRENDAN BORRELL**

Archaeologist Pheng Sam Oeun was chatting with a park ranger at Preah Vihear when the artillery barrage started. It was 6:15 p.m. on February 4, 2011, and he had just finished his workday at the administrative center at the base of the mountain where the 1,100-year-old Khmer temple complex stands. In spite of the apparent danger, Pheng and the park ranger stood and watched the scene unfolding in the mountains above: flashes of

light from the artillery fire accompanied by the crack of gun shots. “We would see the fire first, and then we heard the sounds,” says Pheng.

Preah Vihear sits just a few hundred feet inside Cambodia’s border with Thailand. Pheng is in charge of preserving the site’s architecture and has been conducting small-scale excavations there, but, predictably, his job is complicated by the conflict.

Half an hour after the fighting had begun, the shelling had grown

so intense that Pheng and the park ranger made a run for their bunker, a section of concrete sewage pipe buried under an eight-foot mound of dirt. For three hours they hid there, slapping at malarial mosquitos and waiting for the skirmish to end. At one point, an 81 mm mortar round ricocheted off the stone threshold of an ornately decorated building, chipping it and killing the temple’s photographer. According to news reports, the attack wounded dozens



This carved stone doorway was the eastern entrance to the first of five temples in the complex. The doorway was previously photographed (inset), likely sometime in the past century, by a researcher from the *École française d'Extrême-Orient*.

of soldiers and civilians, and at least seven were killed. The incident touched off six months of intermittent fighting at the site.

Cambodia and Thailand have argued and fought over the ownership of Preah Vihear for more than 100 years. But the most recent cause of tension was that the temple complex was designated a United Nations Education Scientific Cultural Organization (UNESCO) World Heritage site in July 2008. Since then, the site has become the object of political posturing by Thai and Cambodian nationalists alike. At stake is the survival of a unique holy place that is important to the cultural heritage of both nations. Preah Vihear could also be an important source of tourist income for Cambodia's struggling economy.



Cambodia and Thailand have been colliding in one way or another since the middle of the Cretaceous period, when geologic forces thrust Thailand's Khorat Plateau above the surrounding plains. The exposed bands of sedimentary rock here and elsewhere became the chief building material for the ancient Khmer Empire, which would ultimately stretch across most of mainland Southeast Asia, including Cam-

bodia, Thailand, and parts of Vietnam. For more than six centuries, the Khmer people dominated Southeast Asia, erecting thousands of lavish monuments and developing a complex system of waterways and reservoirs, known as *baray*, to irrigate their fields and feed their people.

The most famous of the Khmer Empire's architectural wonders is the former capital of Angkor, known for its elaborate temples, among them Angkor Wat. While Preah Vihear is not nearly as large as the ruins of Angkor, the art and

architecture are significant and its setting is far more spectacular.

The first archaeological investigation of Preah Vihear was conducted when the French colonized the region. The first Westerner to see the ruins was French explorer and archaeologist Étienne Aymonier, who came to the temple in 1883 and later described its architecture, as well as the Khmer and Sanskrit inscriptions. Henri Parmentier of the École française d'Extrême-Orient visited the monument in 1924 and returned to clear the vegetation from it five years later, sketching

Preah Vihear is a series of buildings arrayed along a 2,600-foot-long central causeway that proceeds dramatically to the edge of a cliff. The complex is meant to represent Mount Meru, the home of Shiva and other Hindu gods. According to Sanskrit inscriptions at Preah Vihear, the temple's formal origins date to Jayavarman II's son, Prince Indrayudha, who, in A.D. 893 installed a fragment from a stone monument called a *lingam* at the site. The lingam, which represents the male sex organ, served two purposes. It was a powerful holy symbol of Shiva,

a wide range of religious practices. By the twelfth century, Buddhism had become the Khmer state religion and Preah Vihear became a Buddhist sanctuary. A small Buddhist monastery still exists near the ruins and saffron-robed monks come to the 900-year-old buildings to conduct their spiritual practices.

Today, there is a forest at the base of the temple complex near the Thai border. A pair of stone lions flanks the path that leads to a grand staircase and the causeway beyond. The stairs themselves are guarded by sculptures



Buddhist monks from a nearby monastery still visit the ruins of Preah Vihear. The temples have been used by Buddhists since at least the 11th century, although the buildings were originally dedicated to Hindu deities.

the architecture and describing its iconography. His work clarified the timeline of temple building. But since Parmentier's time, very little work and no excavations had been undertaken at the site—until relatively recently, when the Cambodian government began preparing to nominate Preah Vihear to the World Heritage List.

and it was intended to mark Preah Vihear as the northern extent of the Khmer Empire at that time.

Much of the stone construction at Preah Vihear took place in the eleventh century, during the reign of King Suryavarman I, a Buddhist who also worshipped the Hindu gods Shiva and Rama, and was tolerant of

of *naga*, supernatural multi-headed serpents. Beyond the naga stand the remains of a type of building called a *gopura*, which were typically built at the gateway of Hindu temples. Little is left standing of the first gopura, labeled gopura V by scholars. There are a few standing columns, some leaning at dangerous angles. The



A large temple in the middle of the complex (top) is decorated with one of the earliest depictions of the Hindu origin story called the Churning of the Sea of Milk (above).

tropical environment has long been exacting a toll on these structures.

The causeway leads past a rectangular pool half-filled with black water and through several more buildings. One of them, gopura IV, is carved with a scene of gods and demons engaged in a struggle to obtain the elixir of immortality. The carving is the earliest known depic-

tion of the Hindu creation story, the Churning of the Sea of Milk.

The causeway ends at an impressive collection of structures. Two buildings flank the entryway to what is called the central sanctuary. Walls surround the sanctuary and the ruins of the main temple buildings stand in the center. Given the way the complex is situated in the landscape, visitors might well expect this last segment of the complex to offer a dramatic vista of the Cambodian plains that stretch for miles beyond. But the temple's builders had a different experience in mind. The sanctuary's final wall blocks the scene. Vittorio Roveda, an art historian at the School of Oriental and African Studies at the University of London, says, "It was intended that monks not be distracted by the spectacular view."

The modern-day conflict over Preah Vihear has its roots in the early twentieth century. A treaty between the governments of France and the kingdom of Siam signed in 1904 redrew the border

dividing what is now Thailand and Cambodia. French surveyors sketched a line that was supposed to follow the watershed boundary, a line that separates the river basins between the two countries. Near



A soldier rests at the base of a multi-headed snake called a *naga*, which is believed to guard the stone causeway between the complex's buildings.

Chicago Doctor Invents Affordable Hearing Aid

Outperforms Many Expensive Hearing Aids

Reported by J. Page

CHICAGO: A local board-certified Ear, Nose, Throat (ENT) physician, Dr. S. Cherukuri, has just shaken up the hearing aid industry with the invention of a medical-grade, affordable hearing aid. **This revolutionary hearing aid is designed to help millions of people with hearing loss who cannot afford—or do not wish to pay—the much higher cost of traditional hearing aids.**

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Since Medicare and most private insurance do not cover the costs of hearing aids, which traditionally run between \$2000-\$6000 for a pair, many of the doctor's patients could not afford the expense. Dr. Cherukuri's goal was to find a reasonable solution that would help with the most common types of hearing loss at an affordable price, not unlike the **“one-size-fits-most”** reading glasses available at drug stores.

He evaluated numerous hearing devices and sound amplifiers, including those seen on television. Without fail, almost all of these were found to amplify bass/low frequencies (below 1000 Hz) and not useful in amplifying the frequencies related to the human voice.

Inspiration from a surprising source

The doctor's inspiration to defeat the powers-that-be that kept inexpensive hearing aids out of the hands of the public actually came from a new cell phone he had just purchased. **“I felt that if someone could devise an affordable device like an iPhone® for about \$200 that could do all sorts of things, I could create a hearing aid at a similar price.”**

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Preah Vihear, the border follows the edge of a cliff but diverges from the cliff near the temple complex so that it is included in Cambodian territory.

In 1953, when France pulled out of Cambodia, Thailand invaded and captured Preah Vihear, prompting Cambodia to file suit in the United Nations' International Court of Justice in The Hague. During the case, Thailand argued that the French map was erroneous and that the temple actually fell on its side of the watershed. Ultimately, Thailand lost the case because they had not previously disputed the boundaries set and the court took that as tacit acceptance of the borders set by the 1904 map. "One may sympathize with Siam's lack of topographical expertise at the time," the judges wrote, "but one is dealing with a sovereign independent State." The court did not, however, rule on an area of land measuring almost two square miles that surrounds the temple, which has been the site of the recent fighting.

Preah Vihear's World Heritage List nomination offered a chance for Cambodia to reconcile with Thai-



Unexploded cluster bombs and land mines remain a danger in the area around Preah Vihear. Both Thailand and Cambodia have accused each other of setting new land mines during the recent conflict.



The last group of buildings in the complex is called the inner sanctuary. The buildings were made with windows on every side except the one facing the Cambodian plain, possibly to keep the view from distracting the monks.

land. In 2003, the two nations had agreed to jointly develop the temple and split the proceeds, with Thailand receiving 30 percent and Cambodia receiving 70. The two nations sought to officially list Preah Vihear as a transboundary site that would be cooperatively managed.

Hope for cooperation at Preah Vihear diminished with the rise of the Yellow Shirts in Thailand—a nationalistic faction that ousted the moderate prime minister Thaksin Shinawatra in a 2006 military coup. About two years later, the Yellow Shirts took to the streets to protest the imminent approval of Preah Vihear's status as a World Heritage site, and called for a criminal investigation of members of the Thai government who supported the listing. Then, on July 15, 2008, a monk and two other Thais entered the disputed territory to plant a Thai flag near the temple. In a separate incident on the same day, a Thai army ranger stepped on an old land mine several miles away and lost a leg.

The two incidents led to thousands of troops massing at the border, and the next three years were marked by deadly skirmishes at Preah Vihear and two other disputed sites near the border, Ta Krabey and Ta Moan. In May 2009, Thai heavy weapons fire started a blaze that burned down a Cambodian village near the stairs that lead up to gopura V, displacing 312 families. Both the Cambodians and the Thais have accused each other of laying new land mines at Preah Vihear. The Cluster Munitions Coalition, a civil society campaign that promotes adherence to an international ban on the use of cluster bombs, also concluded that the Thais had fired cluster bombs at the temple and neighboring villages during the clash in February 2011.

More recently, despite this record of conflict, there have been signs that a lasting peace may be possible. In July 2011, the Yellow Shirt government lost power, and the new Red Shirt government seems less inter-

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ested in fighting over the site. That same month, the United Nation International Court of Justice ordered that both countries withdraw all their troops from the area, and, while there is still some military presence at the site, there has not been any recent shooting. The court has also scheduled hearings for April

ravine, to the base of the temple. Most of the archaeological work at the site is focused on finding ways to preserve the stone buildings, and to allow a 2,500-step wooden staircase to be built alongside the ancient one without damaging any archaeological remains. The excavations have turned up some pottery sherds, roof tiles

trench from the baray to carry water to a neighboring village. But there are much bigger hopes that go along with Preah Vihear's World Heritage site designation.

In 1992, the medieval city of Angkor became Cambodia's first UNESCO World Heritage site and a major source of income for the impover-

ished nation. The country had been torn apart by both the Vietnam War and the Khmer Rouge, who ruled from 1975 to 1979, a period when roughly one-quarter of Cambodia's eight million people died. Helaine Silverman, an anthropologist at the University of Illinois at Urbana-Champaign, has written that by nominating Angkor Wat to the World Heritage List, Cambodia "was demonstrating its definitive victory over the Khmer Rouge," although the Khmer Rouge continued fighting until the late 1990s. It is hoped that Preah Vihear's listing will be another step toward prosperity for Cambodia. The site



Workers install braces to attempt to stabilize a building at Preah Vihear. A team of researchers is working on a long-term plan to preserve the structures and manage tourism at the site.

2013 to settle the question of which nation owns the disputed territory surrounding the temple complex. The ruling could finally settle the border dispute, allowing the work of preserving and developing the site to begin in earnest.

While Preah Vihear was named a World Heritage site in 2008, archaeologists are still working on a management plan for the site. As part of that plan, Pheng Sam Ouen led a research team that has dug five trenches along a crumbling ancient staircase that leads hundreds of feet up from the valley floor, through a forested

from the temples, and military artifacts that date to the 1980s, when the Khmer Rouge still controlled the area.

Pheng hopes to learn more about the people who lived around the temple. He has found archaeological evidence of seven settlements within the temple complex and five more in the foothills. The remains of a building that may have been a hospital and a small village likely dating to the twelfth century have been found at the base of the mountain. Pheng and his colleagues also hope to restore at least one empty baray at the base of the mountain so that the reservoir can be used for irrigation. They are also building a six-mile-long

would provide a destination in the less-developed northern part of the country, which might entice some of the tourists who visit Angkor Wat to extend their stays. Nonetheless, that is not likely to happen while the threat of fighting exists. "We are not powerful compared to Thailand," Pheng says. "There are a lot of Khmer sites in Thailand, and we never think that they belong to Cambodia! I never tell my son that the Khmer Empire once extended to the Chinese border, and when he is older he must take it back." ■

Brendan Borrell is a fellow with the Alicia Patterson Foundation.

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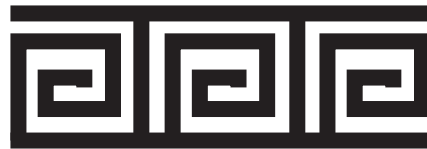
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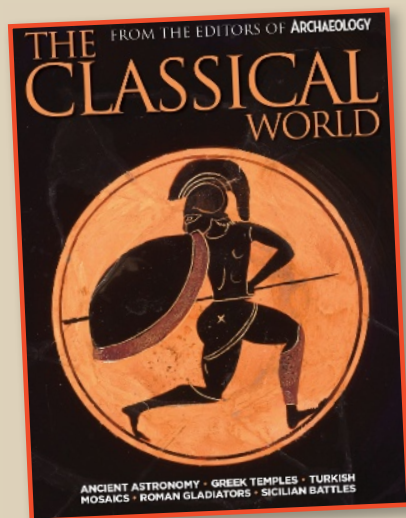
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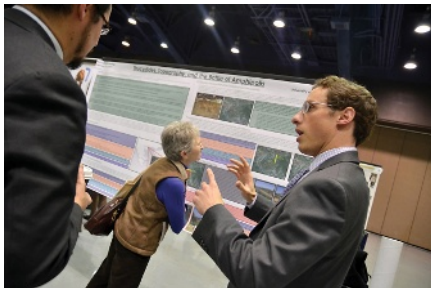
EXCAVATE, EDUCATE, ADVOCATE

Annual Meeting in Seattle Features Largest Academic Program Ever

OVER FOUR DAYS, FROM January 3 through 6, the 114th AIA-APA Joint Annual Meeting featured more than 800 papers, presented in 140 sessions, to approximately 2,300 attendees, making it the largest academic program ever offered at an Annual Meeting. But the academic papers were only one part of a diverse program that also included a public lecture, several colloquia and workshops, roundtable discussions, poster sessions, public readings, multiple receptions and dinners, and even an opera. With its varied program and agenda, the Annual Meeting in Seattle was a wonderful opportunity for attendees to discuss the latest



Annual Meeting attendees enjoy the Opening Night Reception.



Some of the field's most exciting research is presented at the poster sessions.

archaeological findings and research, to network with other members of the archaeological community, and to socialize with colleagues and friends.

The meeting kicked off with an outstanding public lecture titled "The Ancient Village and Synagogue at Huqoq in Galilee," presented by Jodi Magness, Kenan Distinguished

Professor for Teaching Excellence in Early Judaism at the University of North Carolina at Chapel Hill. Magness' lecture featured the spectacular mosaics discovered at the site of Huqoq in June 2012. Her lively presentation spanned several centuries and wove together evidence from archaeology and history to present a compelling account of the mosaics, their significance, and the story of their discovery. The lecture was followed by an Opening Night Reception in the spectacular glass-enclosed lobby of the Washington State Convention Center—one of the venues for the meeting, along with the Sheraton Seattle and the Grand Hyatt hotels.

Highlights from the academic program included the AIA Presidential Plenary Session titled "The Ancient City," which discussed urbanization in Europe, Southeast Asia, South America, and North America. The plenary session, organized by AIA President Elizabeth Bartman, was the second in a series that has in successive years investigated major archaeological themes.

A symposium organized to honor Jeremy B. Rutter, winner of the 2013 AIA Gold Medal Award for Distinguished Archaeological Achievement, addressed the impact of Rutter's work and interpretations on pottery analysis in the Eastern Mediterranean. Major archaeological projects

supported by the Packard Humanities Institute (PHI) were featured at a colloquium honoring David W. Packard, Jr., winner of the 2013 AIA Outstanding Public Service Award. And the Cultural Heritage by AIA-Military Panel (CHAMP) organized a workshop that discussed best practices for aiding the military in preserving cultural heritage.

The 114th Annual Meeting featured several new programs, including the AIA Evening Lightning Session and the Undergraduate Paper Session. The Lightning Session was a fast-paced, informal session in which speakers gave five-minute presentations on current research, case studies, and methodological problems to an audience that was encouraged to provide feedback and comments. The Undergraduate Paper Session provided six of the Institute's younger scholars with the opportunity to present their work to the conference's international audience of professional archaeologists, classicists, and epigraphers.

But the latest discoveries and research findings were not the only themes covered at the Annual Meeting. Several workshops and roundtables featured topics of practical importance to archaeologists. The AIA Museums and Exhibitions Committee and the Seattle Art Museum co-organized a workshop moderated by Kenneth Lapatin of the J. Paul Getty Museum that discussed the challenges and goals of displaying ancient works of art in an encyclopedic museum. In "Integrating Conservation and Archaeology: Exploration of Best Practices," a workshop sponsored by the AIA Conservation and Site Preservation Committee, a panel of seven archaeologists and conservators discussed how conservation measures can be effectively integrated with archaeological research at both terrestrial and maritime sites. The AIA Over Lunch discussion series featured intellectual property attorney and academic Paul Connuck offering useful advice on protecting intellectual property

rights. The Job Search Workshop provided job-seekers with guidance on finding jobs, and the Beginning Career Professionals Cocktail Networking Hour encouraged recent graduates and early career professionals to socialize and interact.

The AIA-APA Joint Annual Meeting is an important forum for the discussion and exchange of infor-

mation and ideas. It provides opportunities for participants to create new partnerships and collaborations, encourages scholars and scholarship, and fosters the growth of the discipline. We invite all of you to participate in this essential annual event at the 115th AIA-APA Joint Annual Meeting in Chicago from January 2 to 5, 2014. See you there!



AIA Honors Award Winners at the Annual Meeting

ANOTABLE AND (VERY) popular event at the Annual Meeting, the AIA Awards Ceremony celebrates the achievements and accomplishments of individuals who have made significant contributions to archaeology and to the Institute through their research and discoveries, innovative techniques and ideas, publications, teaching, and service. This year's list of winners included archaeologists, museum professionals, scientists, conservators, and philanthropists.

Gold Medal Award for Distinguished Archaeological Achievement:

Jeremy B. Rutter

Pomerance Award for Scientific Contributions to Archaeology:

Stephen Weiner

Outstanding Public Service Award: David W. Packard, Jr.

Martha and Artemis Joukowsky Distinguished Service Award:

Claire Lyons

Conservation and Heritage Management Award: Sudharshan Seneviratne

Best Practices in Site Preservation Award: George Bey

Best Practices in Site Preservation Award: Cristina Vidal Lorenzo and

Gaspar Muñoz Cosme

Excellence in Undergraduate Teaching Award: Elise Friedland

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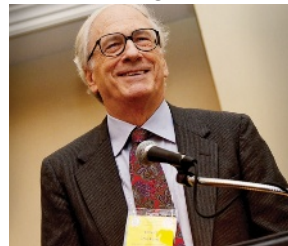
FOR THE LAST 13 years, a major public outreach event at the Annual Meeting has been the AIA Archaeology Fair. Through public-friendly, hands-on programs suitable for people of all ages and interest levels, fairs highlight archaeology. The event is especially popular with families, students, and teachers, and is a great way to introduce people to archaeology and the AIA. Presenters at the fair come mainly from local museums, archaeological organizations, historical societies, and universities. The event is an opportunity for these groups to connect with each other, present their programs and resources, and, most importantly, interact with the public. For the AIA, it is a way to get people involved with archaeology and discover local resources.

The 13th Annual AIA Archaeology Fair was co-organized by the Burke Museum of Natural History and Culture located on the campus of the University of Washington in Seattle.

The fair was the signature event of the Burke's annual Archaeology Day celebration. Almost 800 people attended the event and interacted with the AIA and eight area organizations, including the Burke Museum Archaeology Department, the Washington State Historical Society, the Center for Wooden Boats, the Suquamish Nation, the University of Washington Archaeology Department, the AIA Seattle Local Society, and Legio VI—Castra Ferrata, Cohors II, a Roman reenactment group. Visitors learned about ancient Egyptian mummies, the archaeology of the Puget Sound, the life of Roman soldiers, Inca quipus, ancient rock art, and much more! Attendees tried on Roman armor, identified local artifacts, and participated in atlatl-throwing. By interacting with the various groups and participating in the activities, each visitor had an opportunity to delve deeper into the wonderful world of archaeology.

David W. Packard, Jr., Winner of Outstanding Public Service Award, Brings Opera to the Annual Meeting

IN HIS ACCEPTANCE SPEECH on receiving the 2013 AIA Outstanding Public Service Award, David W. Packard, Jr., mentioned that he had first attended an AIA meeting 50 years earlier as a graduate student. By presenting Packard with the Outstanding Public Service Award, the AIA recognized and honored Packard's long involvement with archaeology



and his continuing generous support of archaeological research through the Packard Humanities Institute (PHI).

Archaeology, however, is not Packard's only interest. Through PHI, Packard also supports the preservation of film and music. Music, in fact, is one of Packard's enduring passions. This love of music and archaeology led Packard and PHI to support Opera San José's production of Mozart's epic drama *Idomeneo*—the mythical story of the king of Crete's return from the Trojan War. The beautifully staged production included sets inspired by Minoan archaeological sites on Crete. A film made of the production was premiered at the Annual Meeting in Seattle. Multiple daily showings of the opera were held at the AMC Theater located half a block from the Washington State Convention Center. The opera was a wonderful and unique addition to the program and the AIA extends its thanks to Dr. Packard.

Societies: Awards Recognize Service; Two New Societies Chartered at the Annual Meeting

REPRESENTATIVES FROM MANY OF the 108 AIA Local Societies attend the Annual Meeting. It is therefore an occasion for the AIA to recognize the important service that the Societies provide in fulfilling the Institute's mission in their local communities. The Society Representatives Breakfast is a popular program that provides an opportunity for Society officers and representatives to meet with one another, discuss Society business and programs, and honor individuals and Societies for various accomplishments. At this year's meeting,

Vice President of Societies Thomas Morton presented the Foot Soldier Award to Meg Morden for her long service to the Toronto Society, the Lecture Flyer Award to the North Alabama Society, the Best Website Award to the Houston Society, and the Golden Marshalltown Award for the greatest percentage increase in membership to the Eugene Society. Additionally, two new Local Societies—Edmonton and Central Carolinas—were chartered at the AIA Council Meeting, bringing the total number of AIA Local Societies to 110.



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When archaeologist Stephanie Simms of Boston University uncovered dozens of fired clay balls at the site of Escalera al Cielo in Yucatán, Mexico, she wasn't sure what to make of them. "At first I thought they could be slingshot ammunition or raw materials for pottery production," says Simms. But by using sophisticated techniques to examine the artifacts on the microscopic level, as well as a battery of experiments, Simms and her team were able to reconstruct their entire history—from raw material to manufacture to use—and conclude that the balls had, in fact, been used for cooking.

The cooking balls were formed with local clay left over from pottery production or collected from the immediate vicinity, allowed to dry, and then fired. Once they had hardened, they were used to line a shallow pit and a fire was built on top of them. When the fire was reduced to embers, food was placed on the spheres, which would distribute the heat evenly.

The entire oven was then covered in leaves and earth to seal in the heat. Simms found evidence that the balls had been heated to between 900 and 1,300 degrees Fahrenheit, temperatures consistent with cooking fires, and that there were traces of starch residues from maize, beans, squash, and arrowroot on the artifacts. There is ample ethnographic evidence of the use of this type of pit oven, usually lined with stones, in the region. It's also possible that the cooking balls were heated and placed directly into pots containing soups or stews.

**WHAT IS IT***Cooking balls***DATE***ca. A.D. 800–950***MATERIAL***Pottery***FOUND***Escalera al Cielo,
Yucatán, Mexico***DIMENSIONS***1 to 2 inches
in diameter;
approximately the size
of a handful of clay*

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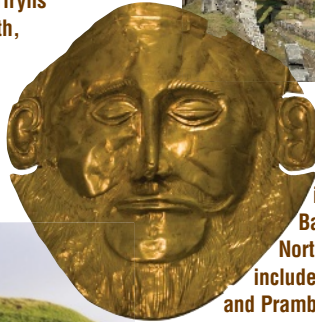
Ancient Rome (12 days)

Examine the monuments of each historical period of Rome as a unit with Prof. Myles McDonnell, Baruch College, CUNY. We begin with Early Rome and the Etruscans, Republican Rome and Rome of the Caesars, Late Republican and Augustan Rome, Early Empire, High Empire and Christian Rome, and end with the Imperial Palaces of the Later Empire. We will spend a day at the ancient port, Ostia Antica, and another at Tivoli, visiting Hadrian's Villa. By looking beneath the contemporary levels of the city we will rediscover significant parts of the ancient city that still exist on the banks of the Tiber.



Prehistoric to Medieval Ireland (18 days)

Explore Ireland's prehistoric and early Christian sites with Prof. Charles Doherty, U. College Dublin. Touring will span thousands of years as we study Neolithic and Bronze Age monuments and artifacts, Celtic defensive systems and stone forts. Highlights include prehistoric Newgrange and Knowth; Dun Aengus fort on the Island of Inishmore; Ring of Kerry; Clonmacnoise monastic settlement; Dublin and Belfast. Our tour is enhanced by traditional music and dance performances and lectures by local archaeologists.



Indonesia (20 days)

Discover the lush tropical islands of Java, Sulawesi and Bali with Prof. Richard Cooler, Northern Illinois U. Highlights include the legendary Borobudur and Prambanan temples, a spectacular trip through mountain villages to the Dieng plateau, Solo's old Javanese culture and the largest temple complex in Indonesia at Panataran. We will spend four days studying the distinctive architecture and funerary rituals of Tana Toraja and end our tour with five days in the magical paradise of Bali. In addition, we have commissioned private musical and dance performances throughout our tour.



Byzantine to Baroque (12 days)

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